The Builder.

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The International Congress of Working Men.

CLASS of men in whom we take a never-failing interest, the actual rank-and-file of the great army of industry, has been holding an international Congress at Brussels. Subjects of the deepest social importance, not to the working men alone, but to all members of civilised society, have been discussed, and the opinions of the French, the Swiss, the German, and the Belgian, have been freely exchanged with those of the English, workman.

The main subjects considered have either been those towards which the congress has sought to direct its action, or those on which it had to seek for further information. Of these, that which is the most important, because on its development depends the power and the wisdom of the workman to deal with the other, appears in the most shadowy state. The congress adjourns till 1869 its reception of a report on education. The main current of opinion, so far as we can gather from the reports, ran in the educational direction. That instruction should be practical and technical, not that of books alone (although not without the aid of book-learning), but that of intellectual, manual, and moral training combined, was the view of the majority; nor did it seem to be contested by any. The difficulties raised were chiefly those that regarded the action of the State upon education. All present appeared to concur in the feeling that education, to be worthy of the name, must be totally removed from the interference of the clergy; and it was pretty plainly intimated that ecclesiastical schooling, directed, as it usually is, chiefly to the maintenance of sacerdotal influence, has a "stupefying" effect upon its recipients.

On the subject of credit, banking, and currency, the discussion at Brussels might rather serve to enforce the necessity of elementary education, than to shed any light upon a subject of which the great principles are not actually unknown. Credit banks, giving aid to every one, and receiving profit from no one;—Government banks, the profit on which should amount to 40,000,000*l.* per annum, and thus save four-sevenths of the annual taxation of the United Kingdom;—above all, banks issuing a currency not convertible into the precious metals,—were among the improvements which the congress wish to see introduced. The one master idea that a bank note is simply a reliable promise from a responsible promiser, and that a promise, to be reliable, must be definite, has not yet been grasped by many of those who would fain instruct others on the subject. Let such a promise be regarded as a sale-note. A sale-note is definite. It undertakes to deliver, at a fixed date and place, a fixed quantity of a certain material. It may be ores, lead, coals, gold, or any other commodity. The principle is the same. We can imagine a highly organised state of barter, in which a very large amount of business should be carried on by means of these sale-notes. In each instance the receiver runs a certain amount of risk. He makes his plans accordingly. We omit any notice of the risk as to the solvency of the utterer of the sale-note. Let us suppose that to be past question. But there still remains the risk of fluctuation in the value of the material. Three months hence the relative value of a ton of iron, and a ton of lead, or a load of corn, may be very different from what it is to-day. This risk is of the very nature of all commercial transactions, and success in speculative business depends, in great measure, on the skill with which the future course of demand and supply may be divined.

But if, to this unavoidable risk, the seller should seek to add another, and that, one dependent solely on his own interest or caprice, the conduct of business would become impossible. A has undertaken to deliver to B, at a fixed date, 100 tons of iron. When the date arrives, the supply of iron in the market is less than the actual demand. Iron has risen in price, as compared, say, with copper. But a large quantity of zinc has been imported from some newly-opened mines. A, therefore, sends to B, instead of the covenanted iron, 80 tons of zinc. B has no want of zinc; his works are standing still for the iron. If this method of substitution were allowed to the debtor, it is clear that all trade would come to a dead lock.

What some financial reformers propose is nothing more nor less than a recourse to such an indefinite system of promises. A five-pound note, now, is an order for the delivery, over the counter of the Bank of England, of an exact weight (an ounce and a third, in round numbers) of gold of a standard quality. So certain is this order to be honoured, that it freely passes from hand to hand as the *representative* of this ounce and a third of metal. The risk of fluctuation in the value of the gold is the only risk (beyond that of fire) borne by the holder of the note; and as this fluctuation is less than that contingent on the value of any other commodity, such an order, or sale-note, is the best possible common measure for all transactions.

The moment, however, that the note is rendered inconvertible,—that is to say, the moment that it ceases to represent a definite commodity, its value becomes matter of credit, or of caprice. We have seen, within the past year or two, how such imaginary or conventional notes,—promises to do nothing definite,—have fluctuated in their power of purchase, in the "green-backs" of America. And while the influence of the mere name of money, the prevalence of the ordinary idea of a bank note, has been such as to prevent these "green-backs" from attaining the extreme depression formerly reached by the French *assignats*, there has prevailed such a relation between the *number* of notes actually issued and their value as measured in gold, as to show that the printing of paper is not the coining of money. *Definiteness of engagement* is the life-blood of commerce. It is by making all engagements indefinite, or at the caprice of the purchaser, that the advocates of inconvertible notes seek to serve society.

A third subject has been approached by the Brussels Congress with considerable hesitation and suspicion. Men brought by steam to the bright little capital could hardly look each other in the face and deny the utility of machinery. Accordingly, more than one speaker carefully guarded himself against the imputation of hostility to the aid of machinery. But the subject was evidently one to which the general opinion was not altogether favourable. The mighty genius that had been invoked by Watt, and bound by Stephenson to the chariot of human progress, was looked upon as a very untrustworthy slave. "The machine was always well oiled,—that is, fat," said one delegate; "The workman was lean." It was proposed to the Congress to resolve that "machinery has proved a most powerful instrument of despotism and extortion in the hands of the capitalist class." There is so much sad and sober truth in this position, that we must ask attention for a word or two on the subject.

It cannot be denied that the introduction of each successive improvement in machinery has been attended by a great amount of suffering among those whose labour is, for the time, displaced by the new competitor. Further, the great revolution which has taken place, and is still going on, in the method of performing what used to be manual work, has been attended, in many instances, with great aggravation of the misery of the producer. Not that this is altogether the case. The producer everywhere has benefited *as a consumer* by the introduction of machinery. But in that growth of great cities which has been stimulated by steam manufacture, in the agglomeration of workmen, the frequent fluctuations and rebate of wages, and all the untold evils of the worst phase of civilization,—very much direct suffering has been, and is, attendant on the development of machine power.

Attendant on it,—occasioned by it,—it is true, but not caused by it. This is the first point to bear in mind. To relieve man of the most crushing part of his toil, by substituting the motive power, first of animals and then of heat, for his sheer naked strength, is to remove the curse from his labour. The race has acquired a slave; the race is in an improved condition from the fact. That the result of that slave's labour has been so unduly proportioned,—that the rich has grown richer, and the poor poorer, by the distribution, may or may not be the case; but if it be so, it is the fault, not of the slave, but of the master,—not of machinery, but of man. It is not the introduction of machinery that has injured the labouring classes, but the contest between avarice and overbearing on one side, and ignorance and obstinacy on the other. Where were we without machinery?

We can answer that question pretty distinctly. Every year adds to the knowledge which we possess of the condition and habits of our ancestors before the invention of machinery. Man had a slave before he learned the use of the mechanical powers, as they are called. When there were no blacksmiths, because iron was unknown; when there were no joiners, because the rude hewing of timber had to be effected by flint axes; when the potter had not learned to use the wheel; and when the shuttle had not displaced the bone needle in the slow and imperfect fabrication of hempen web,—the slave of man was WOMAN.

Our earliest historic works, the sculptures and bas-reliefs of Asian and of Egyptian antiquity, the implements discovered in barrows, at the bottom of lakes, and in the vicinity of other scenes of ancient habitation, the present habits of the wildest human races,—all tell the same tale. The traveller over many parts of the Continent who visits agricultural spots as yet undefiled by the steam-plough, may say that it is not with the naked savage alone that woman is to be found in a state of slavery. In the field labour of many parts of France, the hardest work still lies on the shoulder of the weaker sex. The earth of the railway embankments of the countries bordering the Mediterranean has for the most part been carried in baskets, on the heads or backs of women. When man has no other slave, he seldom fails to lay hard service on his wife.

In her own immediate sphere of the housewife, the labour of woman, before machines were made, was not slight. The preparation of bread was her daily task. To beat out the grain from the ears, and to grind it into a coarse and unpalatable meal between two stones, was the wont of our ancestresses. The first lightening of their toil arose from the invention of the

quern, or hand-mill. How naturally do ancient writers speak of "two women grinding at the mill," and speak as if that hard and thankless labour were to be the constant duty of the sex!

During the darker ages of European history, disputes were high around the meal-sack. The tyranny of the feudal lord was at times bitterly complained of. He compelled his peasants to bring their corn to *his* mill to be ground. He took, no doubt, a heavy mulcture. Some of the grist, moreover, stuck to the dusty fingers of the miller. There can be no doubt of the abuses and of the hardships that often attended the compulsory age of the seignoral mills, in feudal times. But of what do those very complaints tell us? They tell us of the invention of the mechanical mill; of the minute reduction of grain to pure and wholesome meal, between a pair of stones; of the whirling of the ponderous mill-stone, not by the hands of woman, but by the cheap and well-applied service of wind or of water. What was the gain to the position of woman in the family, and thus to the elevation of the race in the scale of intelligence, of comfort, and of elegance, by the displacement of the daily toil of the quern by the machinery of the flour-mill?

In this instance of the earliest introduction of machinery, propelled by any other than human, or, at least, by animal strength, we see an illustration of the whole history of the subject. The function of machinery is to free man from the more painful, more degrading, and more brutal, forms of labour, and thus to give him both time and stimulus to increase his skill, his knowledge, and the productive character of his industry. He may be slow and stupid in learning the lesson. So much the worse for him! But he can not fail to learn it sooner or later.

The history of individuals to a great extent reproduces itself. The same recurrent phases of life are undergone by the king and the peasant, by the Celtic rampart builder of thousands of years back, and the Coventry ribbon-weaver of to-day. To take his place in the series of fleeting generations, each individual must be born into the family circle. Arrived at maturity, he marries, or continues the family. He passes from it by death, and leaves his place to another. All the busy occupation of his waking hours only fills up the intervals between those three great duties paid to his species. But the history of the race is a widely different matter. Comprehending, as it does, nay consisting as it does of, individual biographies, it yet tells a tale of steady, certain, irresistible progress. That progress consists in the establishment of the dominion of man over matter. His mission is not only to replenish the earth, but to subdue it. He has been much more ready to fulfil the earlier, than the later, clause of the command; for man's subjugation of earth, to be worthy the name, is not that of the wild hunter and fisher who yet roves unclad in the interior of Africa or the fast-diminishing forests of America. It is not that nomadic possession which the Bedouins, and other pastoral tribes of our day, keep, with as loose and thriftless a hold as did their ancestry in the time of the shepherd kings of Egypt. It is not the possession enforced by a hedge of bristling bayonets, or by the loud-voiced thunderbolts of war. It is the possession of the cultivator, the builder, the architect, the engineer. It is the subjection to human service of the force of the wind and of the waterfall. It is the exaction of duty from the unimprisoned genius of heat, which has for so many thousands of years been bound in the unopened coal-seam. It is the power of putting nature to the question, by the analysis of the chemist, and of learning direct from her replies how best to feed, and to clothe, and to comfort the feeble infants of our kind. It is the power to raise a bushel of corn where once grew a tangle of couch-grass;—to span the ocean;—to defy wind and tide;—to make the very material of the lightning convey the articulate message of human will.

The advance which has been made in this method of subjugating nature, within the past century, has been far greater than that which all the preceding centuries of human abode on earth have witnessed. It is true that, in the great struggle, we may have lost, or thrown aside, some of the earlier marks of our nobility. In our pursuit of accurate scientific knowledge, and our attainment of practical mechanical skill, we may have deteriorated in art, in poetry, in oratory;—in the adornments of the infancy of a race. We cannot now produce sculpture like that of the age of Pericles, we cannot mix the unfading hues of Perugino or of Titian, we cannot speak in the music of Homer, or with the perfect mastery of language attained by Shakspeare. Our pulpits may give forth uncertain and discordant sounds; our legislators may laugh in the sleeve if any one speaks to them of patriotism or of self devotion; our men of business may have little time to spare from the rapid accumulation of capital.

But amid all this,—in spite of it,—by means of it,—the great scientific conquest is pushed on. We are advancing along the whole line. It is not a century since we made our island permeable by roads—since we learned to make smooth highways of broken stone, and to traverse them at the rate of ten miles an hour on carriages furnished with the novel appliance of steel springs. It is not longer since we opened water-ways from shore to shore, from Thames to Trent and to Severn, for the transport of heavy goods. Already our turnpike roads are grass-grown, and our canals are strangled with weeds. An entirely new locomotive system has superseded the great improvements in transit effected in the eighteenth century, and already our new roads are so choked by the traffic which they have evoked that great improvement is demanded. All sheer labour is being lightened to man. Even the ancient and simple tool, in the employment of which man has entered into partnership with the horse, and, long before he tamed the horse, with the ox, from the very commencement of agriculture, is becoming obsolete. If anything had a long future predicted for it, it was the plough. Where will the plough be twenty years hence? How rude and petty will be the tillage from which it is not driven by the use of the steam cultivator? If there was one section of human labour in which, more than in any other, it seemed unlikely that the steam-engine could be advantageously employed, it was that of breaking up the surface of a large extent of country. What is the case now? What is, we do not say the opinion, but the experience, of any farmer who has given a fair trial to steam-cultivation? Like the spirit evoked by Michael Scott, the genius of steam is constantly demanding fresh employment at our hands. And are we now to speak of putting restrictions on the employment of machinery?

Those alone are the true friends of the working man who open his eyes to truth. There is much, no doubt, that yet remains for discussion and for elucidation in what has been called social science. There is room enough for the luxury of ample difference of opinion. But certain great laws underlie all human action. They are either laws of thought—such as are illustrated in the question of the measure of value, before referred to—or laws of observation, derived from a long series of observation, such as that which prescribes the gradual displacement of human labour by the use of machinery. In all social progress, and in every amendment of the position of the workman, these laws must have their due influence. Those who attempt to start theories, and to reform society, without, in the first instance, having the patience to ascertain all that is actually known on the subject of their lucubrations, do worse than waste their own time. In so far as they misdirect the working energy of those who listen to them, they become obstructive and reactionary. Those who seek to turn the stream of progress up-hill will only get drenched for their pains.

That a new era is opening for labour, we not only trust, but believe. That this better age will be attained by the development of industry, within its own proper sphere of action, and not by its direction into political channels, we hold to be certain. The province in which industry has attained its greatest triumphs, is that which promises best for the future. That a co-operation of the productive forces, not a forcible antagonism between capital and labour, but the aid of the labourer of to-day by the stored labour of generations of labourers who have preceded him, is the great requisite for progress which experience denotes, there can be no denial. That the credit which arises from trust in character, and not the artificial operations of imaginary banking schemes, will form the sinews of successful organisation, we also hold. And it will be by the final performance, by tools and mechanism driven by steam or electricity, of all that man shall hereafter have to do, except to think, and to enjoy the full exercise of his intellectual and animal functions, that we hold that the final subjugation of the material world will be effected. It is towards that end that the race has, slowly and blindly, but no less certainly, advanced, since bronze replaced stone, and the corn-mill was substituted for the quern.

GENERALISATION IN ARCHITECTURAL EDUCATION.

In a previous article* we endeavoured to point out how much the idea implied in the term "generalisation," the perception of broad laws and principles permeating and linking together branches of study and knowledge, which to a cursory glance might seem perfectly independent, in a grand and comprehensive unity of plan, is underlying and influencing all the best intellectual life and progress of the present time; and how the art of architecture, as a kind of *microcosm* in the great world of art, seems peculiarly to demand this generalising spirit in its practitioners, both from its central position with regard to other arts, and from the absence of the definite expression† and imitation which serve to mark clearly the prime end and object of these latter, in the delineation and presentation of physical beauty; while architecture is rather occupied with that metaphysical beauty which, while directly imitating no natural object, seeks to govern itself by those general abstract laws of harmony of proportions, and fitness of means to an end, of which all natural forms are but so many separate and concrete instances. Nor is it possible to look at the profession of architecture from this point of view, without perceiving not only how much it is hereby elevated above the commonplace brick and mortar and specification standard, but also how much mental training and delicacy of taste and perception is necessary to acquire even the capability of appreciating such subtle relations between principles and ideas and external forms, much more the power of designing and carrying out a work in accordance therewith. This we take to be the real reason why architectural art is so little comprehended by the mass of outsiders, and why, for ten persons who can form a fair judgment as to the merit of a painting, there is scarce one to be found who has the slightest notion of the merits or faults of a building, or why they should be called merits or faults at all, or what architecture essentially consists in; the preferences of the public on such matters being almost entirely governed (as some architects know to their cost) either by fashion and prejudice, or by whims of the most absurd and unreasonable description. The relation between the purpose and the site of a building on the one hand, and the form and character of its design and detail on the other, cannot be perceived or judged of without a degree of general cultivation of intellect which is at present, unfortunately, the reverse of ordinary; and, considering this—considering what a large demand must be made upon refined intellectual perception, in addition to mere practice of hand and eye, in determining, for instance, how an isolated building should be placed with reference to the landscape around it, what character of outline will best harmonise with such landscape, to what extent and in what manner the purpose and interior plan of the building should be indicated in the exterior design and grouping, what style and amount of ornament will be in keeping with that purpose, and where and how the decoration should be placed so as to enhance and not encumber the expression of the design, it certainly appears of great, even of paramount importance, that those who have to decide in such matters should have an education calculated to develop and strengthen the powers of the mind generally, and enable them to use pencil and compasses in accordance with certain and definite principles,—considerations which will appear of none the less weight when we reflect upon the monumental and enduring character of large architectural works, which, unlike pictures and poems, are forced under our notice whether we will or no, and remain as objects of pleasure or annoyance for perhaps many generations. Viewed in this light, how does our present system of architectural education appear?

It is customary at present to speak with much pity and contempt of those good old days when an architectural pupil was solemnly and in set form introduced to the "Five Orders" as the "be-all and the end-all" of architectural excellence, to be studied and copied with rigid exactness through all the conventionalities of "modules" and "parts." Doubtless there is an activity and energy in the modern practice of the art not

* See p. 672, *ante*.

† One of the many points in which architecture resembles music, and may be classed with that art in its effects on the mind; but to go at all fully into this fascinating subject would require a separate essay.

to be found among the dry bones of quasi-classicalities; yet it must not be forgotten that in that slower-pacing generation there was more time given for thinking out the plan of a work than now, and that the mere study and contact with forms so lofty and pure in themselves as the relics of Greek art were not without their influence in refining and educating the mind and connecting the idea of an architect with that of a cultivated gentleman more decidedly than, it is to be feared, is now the case. How much of thought, and care, and study, how much of the refining influence of a familiarity with delicate and beautiful forms, either in drawings or their actual remains, went to the producing of a first-class architect in those benighted Pagan times, let the lives and works of Cockerell and Barry * attest against all counter-prejudice. But, admitting all that is to be said against the one-sidedness and comparative barrenness of the "five orders" system, an impartial observer will scarcely see that we are, in our theory of education at least, any more rational now. The usual course of things is much on this wise: a lad shows talents for drawing, and predilections for drawing buildings (this is supposing a favourable case, for natural talent is by no means considered a *sine qud non* for entering the profession); and hereupon his friends make exertions to get him into the office of some eminent architect, in the high-tide of successful practice. "It is a heavy premium, to be sure; but then it is such an advantage to get him into ——'s office!" and into ——'s office he accordingly goes. And now, in the name of common sense, what is it that he learns, or is expected to learn there, in any sense which ought to be attached to the word "learn?" His friends give themselves little concern about this; it is the usual system, and everybody speaks very highly of this particular office, &c. But, in point of fact, architectural education he gets none, so far as education signifies the gradual development and strengthening of the abilities in a special direction and with a special object. He enters the office with no definite idea as to the limits and objects of the profession he is to acquire, no general idea of any leading principles connected with it, often with not even a general notion of its history (though this latter may be through his own neglect). The principal, whose time is probably occupied with multifarious works, of which he can only manage in a hurried manner to direct and oversee the leading details, cannot of course pretend to instruct the pupil systematically, or even to instruct him at all; and the latter is consequently simply thrown into the midst of a chaos of work to pick up what he can. By degrees he begins to attach a definite meaning to what at first seem the cabalistic and inexplicable diagrams that come under his eyes, and attains by little and little a facility in reproducing ornamental detail of the same kind as what he constantly sees, and a certain indiscriminate acquaintance with various details of construction; but in most cases it is long before he is able to generalise sufficiently from these to arrive at a comprehensive view of the whole system of design and construction pursued in the office, and the relation of one part to another. But having attained this, what has he really learnt? Proposing to qualify himself for a profession which, above all other artistic professions (if our views are correct), requires a comprehensive study of its history and its bearing upon other arts to rightly understand it, he has simply acquired a knowledge of the method of practising this profession by one single man at one single period; the said practitioner being by no means infallible, and indeed being by possibility a very shallow though clever and energetic hard-working man: for popular success is no evidence, either in architecture or in anything else, of the possession of any deep thought or clear principle. The pupil (we speak now of a good specimen) has indeed got what his parents and guardians paid for, the capability of making a living by his profession; even of getting some credit by it, as times now go. He has the prestige of the office he has served his time in, to begin with, which gains him credit with that large majority of persons who cannot judge for themselves, and are consequently obliged to take everything on trust; and he has gained by long habit a ready facility in "knocking off" designs and details in the style and manner of his former master; and in these hurrying days, when all who want buildings want them at once, readiness is everything, and no one stops to inquire whether (to parody Goldsmith's connoisseur) the building might have been better if the architect had bestowed more thought on it. And while, on the one hand, it must be owned that none but a man of very decidedly original talent could possibly go through this course of apprenticeship in one office, hard at work in only one style (or rather one *manner*), without unconsciously falling completely into the manner of his master, as a kind of transmitted instinct; on the other hand, it is evident that to acquire a power of rapidly "designing" (as it is facetiously termed) in this parrot-like manner demands no high order of talent, being little more than a matter of habit; the one thing indispensable to success being that the style or manner should be a popular one. It is owing, in a great degree, to this fatal facility in acquiring a popular style of draughtsmanship, that the intellectual *status* of the profession, even judged of from among the ranks of the tolerably successful men, is sensibly lowered. Without wishing to be censorious, it must be said that the guahing young architect of the present day is not a type of character on which men of intellectual training will be inclined to look with much respect. He has good qualities certainly; the best of which are that he generally has a love of his profession *per se*, and that he works very hard; commonly, indeed, to the exclusion of all interest in wider and more general and intellectual pursuits. But he is loud-talking, bustling, egotistical, and affects a kind of "slap-dash" manner calculated to impress you with an idea of the press of work he always has to get through. He has a great respect for Mediæval literature (it is the only one he is acquainted with), with a supreme contempt for the Renaissance in all its developments; and holds Rossetti to be the only modern painter worth looking at. His office is strewn with barbaric pieces of furniture of the most inconvenient and clumsy make, painted in violent colours or inlaid with Feejee ornament; he dabbles in Ritualism, and "goes in" for church millinery and floral decorations. As we have said, there is good in him; but on the whole we prefer the old classic type of architect to this latest invention; and at least it is not to such persons, trained under such a system of non-education as we have hinted at, that any thoughtful man would wish to find the future aspect and architectural expression of our streets and public buildings entrusted, seeing that what is done in these matters cannot easily be undone.

Neither type, however, we apprehend, will accomplish the work which seems likely to be demanded of the architectural profession in an age which is yearly showing stronger symptoms of its impatience of anything like a sham, which is getting into the habit of inquiring the why and the wherefore of everything, and of insisting on a general fitness of things, and a banishment of anomalies. The dissatisfaction expressed *in re* the Law Courts designs, with all their splendid elaboration of drawing; the strong sense exhibited, in some not unimportant quarters, of the absurdity of such an insane sprouting forth of towers and turrets as came to light on that occasion, show which way the wind sits, and indicate a possibility that the architect may even be called upon by the intellectual part of the public to show cause for his existence, unless he can do something more to the purpose than this. And if he is to go successfully through such an ordeal, architectural design must certainly be made more a matter of thought and reflection, and less a thing of habit, than it is at present. And the main step to this will be that the present system of what is called architectural education be as nearly as possible reversed. To turn a boy loose into the midst of architectural work, to fish up for himself a bit of information here and a bit of experience there, is to ignore all logical principles of education altogether; and is so far worse than valueless, inasmuch as it leaves him free to imitate and adopt any practice or predilection of his master, however illgrounded and absurd these may be, seeing that he is not supposed to be prepared by any study of the history and principles of architecture as a whole, which might teach him how to refuse the evil and choose the good: nor, for the same reason, is he in any position to make the most of information which may be really valuable, not having the data whereby to measure its real importance or bearing with regard to the whole field of his profession.

The branch of knowledge which alone can be acquired in a practising architect's office, and nowhere else, is just that which the pupil stands in need of rather at the close than at the commencement of his studies, viz., the practical constructive details, and the general working of the profession in its relation to the two classes, capitalists and the building trades, between whom it has to arbitrate. Before he can be competent to carry on a practice on his own account, it is necessary that he should have experience in these matters; but these do not constitute the art of architecture, the end and object of which, broadly stated, is so to plan, group, and ornament buildings as to transform that which is originally merely a material necessity into a source of intellectual pleasure.

Here, then, we return to our leading idea of "generalisation;" and we do most strongly urge, upon the grounds aforesaid, that any proper, natural, rational system of architectural education must commence with, and, indeed, mainly consist of, such a training in the general principles of art, and the application of these to the conditions and objects of the art-architectural in particular, such a general and comprehensive view of the history of *all* the leading styles considered in relation to the conditions of climate, society, &c., under which they were evolved—and such a cultivation and refinement of the intellect through the agency of literary, and what we will call metaphysical, study (taking the word in a wider sense than usual)—as may qualify the student when he comes to deal practically with his profession, to subordinate details into their proper place as parts of one scheme, to exercise a deliberate judgment as to what sources of effect commonly employed are legitimate and suitable for his purpose, and to take a comprehensive view of the requirements and tendencies of his own time and circumstances, and so produce, not at haphazard, but on principle, that which will be permanently acceptable and valuable to the best educated part of the public. Along with these general studies will, of course, go the practice of drawing and designing, instruction in the general principles of mechanics and of construction with various materials, and an elementary knowledge of the principles and practice of the various arts which touch upon architecture as ornamental and accessory; always keeping in mind the main object of architecture as just now stated, and admitting any accessory branch of study only so far as it educates the mind towards that end, not following it out to the point where it entirely diverges from any connexion with architecture.

This kind of scheme, thus roughly shadowed forth, is what we mean when we speak of a generalisation of architectural education; and all students of average ability, who had passed through the discipline of such a system, would, we apprehend, find themselves in a position to learn more of the practical working of their profession in the course of one year in an architect's office,—more, that is to say, which will be of real value to them,—than in the course of the five years now commonly spent in an architectural apprenticeship; while, if time and opportunity are favourable for the carrying out of a sketching tour or an extensive round of visits to existing buildings, ancient or modern, not only will this comprehensive education give a far deeper interest and significance to these than they can ever have for the mere facile draughtsman, but the cautious and judicial habit of mind which any education worth the name always induces, will guard them against being carried away by this or that grand relic of an old style into the lust of imitation, and the folly (so universal at present) of raking out details and oddities from old remains, to be repeated in a meaningless kind of manner at home. But the existence or carrying out of such a complete scheme of architectural education as we have indicated, presupposes either the foundation of a national college of architects and engineers (as the two professions overlap to some extent, though not so much as is often imagined), or else the institution of regular architectural degrees, combined with facilities for a complete education in the theory and a certain part of the artistic practice of architecture, at our existing seats of learning. With regard to the former idea, what difficulties there certainly would be in founding

* As a single instance alike of the defects and merits of the period, take the Royal Institution at Manchester, one of Barry's early works: externally it is not the least fitted for a northern manufacturing town, whether as to expression of design or practical power to stand against the onslaught of smoke and weather; yet in the interior, with its central staircase and saloons divided by low columned corridors, there is evident a distinct thought, and a simplicity, yet originality, of *architecturesque* effect, which we may look for in vain through many a score of sets of recent competition drawings.

it, and what drawbacks there might be in the working of such an institution it would be far too long a business to discuss here; but it is known that our German neighbours have long carried on the system of collegiate education for the architectural and engineering professions with apparently a great measure of success; and certainly, in conversing with German architects who have been so educated, we have always been struck, even in the case of men not distinguished for any brilliant talent in their profession, with the apparently complete and all-round character of their professional knowledge, as compared with the results, in men of the same calibre, of the desultory and onesided, though, perhaps, in some respects, more practical education attainable among ourselves. The second proposition is one which we should imagine not only could be, but ought to be, and before long must be carried out at our universities, unless they are destined to lose all title to their supposed rank as the great centres of education for the youth of England. We are far from undervaluing what is called classical education, believing that the study of the Greek language and literature in particular is a refining influence which nothing can thoroughly stand in stead of; but does it not seem a gross absurdity that a man can attain the highest honours which the two older universities have to give without any knowledge of the science which has changed the face of the globe, and gone far to revolutionise society, and without having gained the slightest insight into the principles or practice of those arts which are the sources of the loftiest and purest enjoyment of which the human mind is capable?

It may be objected, with some show of reason, that in pleading for more attention to general education and mental culture, in preparing for the profession of architecture, we advocate a system which would unduly distract the mind of the student from acquiring the practical knowledge and practical power of design, the adequate attainment of which, it may be urged, is itself enough for any one man's task. But this notion of the multiplicity of the subjects of architectural study is much exaggerated by the want of consideration on the part of both learners and teachers as to what is really required, and what is not. For instance, a move has lately been made in certain quarters for teaching water-colour drawing to young architects, and forming classes for the purpose. One can scarcely regret that so delightful a branch of art should be encouraged in any way, but it ought to be pointed out that the sole practical use of such an acquirement to the architect, is to enable him to enter the baneful lists of architectural competition (soon we hope to be closed), without the expensive aid of the professed colourist. For any aid towards the one object of the architect, the production of a well-considered building, the study of water-colour is all but valueless. This is one of other instances that might be named of the manner in which the energies of the student are often diverted to matters which are not really necessary or helpful to him as an architect; not to mention also the priceless time which, under the apprenticing system, is wasted in mere routine office work, tracing drawings, &c., which might have been employed in studies of permanent value and importance. Let us also guard against another misconstruction that may be put upon our remarks, either wilfully or otherwise. Let us not be understood to be for a moment upholding the visionary idea that a man may philosophise himself into an artist in any way; that thought and mental cultivation can supersede in any manner the training of hand and eye in practical drawing. There is no such royal road to success. But it is a fact, patent to all who live and work with their eyes open, that in the architectural practice of the present day a great deal too much importance is attached to mere *tours de force* in drawing; the result being not only that much valuable time is wasted in merely getting up drawings to look well (a process which, of course, has no more effect upon the ultimate value of the design than has the water-colour study before mentioned); but that success in the profession is really coming to depend very much upon mere rapid and clever draughtsmanship, the manner of which, as we observed, is caught up, with little aid from thought or education, from one successful practitioner by a number of pupils and draughtsmen, and thus disseminated abroad, cheating the public into the belief that we have an overflowing of talented architects amongst us; the real truth being only that we possess a number of clever imitative draughtsmen. Now, it is peculiarly necessary in the present day that the hand in using the pencil should be under the guidance of the mind; because, owing to the amount of material before us to choose from, in the histories and remains of past periods of art, and from the increased intercommunication between different countries, we are not in the isolated position that our Mediæval forefathers (for instance) were in, and we must of necessity have some principle to guide us in selecting what is best to follow and imitate, so far as imitation is necessary, which it always will be to some extent. In a time when there is so much to be learnt, so much work to be done, and such an increasing necessity for something like a division of labour, nothing can be really of greater importance to a man, whatever his profession, than to ascertain his real place in connexion with the work of the world around him, and how he can so carry on his own branch of work as to go with and supplement the main current of human energy, which, labouring apparently in so incongruous a manner, is yet in the main proceeding so surely towards one end, that all work which does not actually conduce to that end will in time have its futility exposed, and be cast aside as rubbish. And what is the use of labouring violently and aimlessly at this or that so-called style of architectural design and ornament, if in the end this prove to have been merely a passing fashion, and your work, instead of remaining a monument to future times, be scouted by the next generation with "This is not what we wanted: you have wasted your time over what is of no use to us: away with it!" In all that concerns that which is enduring in art, the race is not to the swift, and while competition draughtsmen are turning out *bravura* drawings by the thousand, the final and lasting success will remain with those who have taken the trouble to look before them in the race, to ascertain what is really wanted of them, what is essential to their profession, and what is merely accidental, and whose motto has been that which must be adopted by all who would produce work worthy of lasting commendation—*festina lente*.

THE HALL OF THE REFORMATION, GENEVA.

ON the 2nd of September, 1861, the tricentenary anniversary of Calvin's death, a congress, composed of Protestant delegates from different parts of Europe, assembled in Geneva, at the instigation of a society called the Evangelical Alliance. Its object was to commemorate this event and to confer on questions of church discipline, and on others of a practical religious character. At the end of its labours it was resolved to perpetuate the memory of this meeting by erecting a monument to Calvin. This object has been carried out, not by erecting a statue, but in conformity with what was the constant aim of the Reformer's teaching, by contributing in a permanent manner to the enlightenment of the people.

Every winter series of lectures on religious subjects are delivered in Geneva by distinguished laymen and clergymen. To these lectures the population, remarkable for its love of philosophical disquisitions and historical inquiry, flocked in numbers so large that no hall then existing could afford comfortable accommodation for the audience. This want of a large public meeting-hall was strongly felt. The Genevese, therefore, thought that the most worthy monument to Calvin would be such a hall destined to continue his mission and diffuse widely among the population the vivifying light of truth. A subscription was set on foot for this purpose, and soon contributions poured in from different parts of Europe. The English contribution was exceedingly large, inferior only to that of Geneva. The amount subscribed was about 10,000*l*. The committee formed for carrying out the resolution of the Congress determined, in order to increase the utility of the building, that it should contain the following rooms:—Firstly, a hall containing 2,000 seats; secondly, a room with 400 seats for smaller assemblies; thirdly, a library with reading-room, destined principally to receive the works of the Reformers; fourthly, two school-rooms for thirty or fifty children; fifthly, an assembly-room for workmen; sixthly, a porter's lodge.

This building was completed and inaugurated on the 26th of September, 1867. Worthy of our attention by the idea from which it originated, it is no less so by its constructive qualities. The architect was Mr. Brocher, of Geneva. It forms a long rectangular edifice, free on three of its sides; the fourth is built against a large dwelling-house. The principal front is divided into three parts by vertical courses in freestone, the mass of the walls being built in masonry pargetted. It is pierced by a large entrance-door and two smaller lateral ones, and by a large bull's-eye in the gable. The two lateral façades are without windows in that portion of their length which flanks the large hall. The walls of this portion are simply enlivened by equidistant vertical courses similar to those of the principal façade.

The inhabited part of the building or the annexe, containing the library and schoolrooms, is characterised as such by the very contrast of its doors and windows with the blind wall of the hall. Through the entrances on the lateral façades we penetrate into the annexe, which is two stories high, and may proceed by a flight of steps down to the underground floor, where we find, firstly, a room intended for evening and Sunday lectures to workmen; secondly, the heating apparatus, for the building is heated by means of hot air. Above this room is the small assembly-hall, from which a private passage, as well as the general staircase, leads to the committee-rooms on the first story. On the second story are the library, the reading-room, and the schoolrooms.

The principal entrance to the great hall is naturally from the front; moreover, three doors lead from the hall into the annexe. The hall is rectangular, with two rows of galleries. It is 108 ft. long and 70 ft. wide. The side opposite the entrance presents to the eye a niche of about 20 ft. in diameter, giving to the interior a severe Byzantine appearance. In this reminiscence of a choir is raised a "tribune," or speaking platform, on which benches for 200 places are arranged in the form of an amphitheatre. This arrangement permits the hall to be also used as a concert-room. The tribune is brought into immediate connexion with the smaller meeting-hall by a door at the back of the niche, so that the members of the committee and the speakers can enter the tribune without passing through the hall. The architect, in order to obtain a roomy, airy appearance, and also to give the hall a character of simple severe truthfulness, thus reflecting the spirit of Calvin's genius, decided on covering it with an apparent roofing of iron and wood, according to the Polloneau system. The acoustic qualities of this hall lead me to mention the construction of its ceiling. It is formed by a wood panelling fixed on the purlins, so that an empty space remains between the ceiling and the wainscoting of the roof. By this disposition the ceiling becomes a large sounding-board, so that the faintest sound is distinctly heard from all parts of the hall. But the most important innovation in this building is the fact of the hall receiving its light through a hypæthral opening in the roof, the walls, as above stated, being pierced by no windows. This disposition, while adding greatly, by concentrating the light, to the effect of the hall, offers considerable facilities for ventilation. But the most important advantage obtained by this arrangement, which leads me to think that this innovation will tend, with time, to gain ground and transform the church style in our towns, is the perfect exclusion of all sound from outside; for though the building is flanked by two large thoroughfares, the inside of the hall is as quiet as if it stood in a desert. Thus I should strongly recommend it as a step in the right way to the study of all thinking architects who seek originality in the real adaptation of our buildings to modern circumstances.

LAWRENCE HARVEY, Architect.

NARROW ESCAPE OF GUILDHALL, LONDON.—A workman, by allowing some turpentine to boil on a fire used for cooking dinner in the mess-room of the workmen employed in repairing the hall-keeper's house (No. 1 Committee Room), set the whole in a blaze; and the flame was not put out till water was brought from the pump in Basinghall-street, as no one knew where to find the key to turn on the water at the three hydrants in the yard. The whole building has thus been imperilled by the carelessness both of the workman and of the waterman, or watchman, or whoever was responsible for the prompt supply of water in case of fire.

ANOTHER TRIP TO NORTH WALES.*

HOWEVER small an old country church may be, there is always some architectural fragment,—a font, or a brass,—to contemplate. As Socrates says, "Pardon me, my excellent friend, for I am a lover of learning. Now the fields and trees will not teach me anything, but men in the city do." There is also always something to be learned from the old clerk's story, who will give an account of that which existed in the church prior to its being *restored*.

Tourists to Llangollen will doubtless recollect a lithograph, by Day & Hague, representing the Right Hon. Lady Butler, aged 90 years, and Miss Ponsonby, aged 74 years (with a greyhound), in walking costume at Plas Newydd, with the old Welsh hats, and in the background a pointed recess in a stone wall with a fountain supplied by a spring. Now the font in Llangollen Church is situated at the west end, in form of a modern marble baluster, surmounted by a washhand-basin. In reply to an inquiry for the ancient font, the clerk referred me to Plas Newydd, and accompanying me thither through romantic grounds, now a wilderness, but formerly bedecked in tea-garden fashion with beautiful Mediæval spoils *taken* from the church and from Valle Crucis Abbey, there was the identical fountain, *alias* the old Perpendicular (not the Early English) stone font, octagonal, and panelled, with rosettes and shields on the stem. The finial or coronet on the recess, shown in the lithograph, is an Early English foliated capital, perfect and nicely cut, placed upside down! Here is a good opportunity, prior to these curious old grounds, well known in history, being swept away, for the Architectural Museum to ask for the ancient capitals, pedestals, bosses, carved figures, and panels (all from the old church and abbey, and many of them stuck higgledy-piggledy on the house), and being in good condition they would form a valuable addition to the existing collection. The old font *must* of course return to the church. About five years ago the subject was discussed by the parish, but the cost of replacing, cleaning, and fitting up the old font would, it is said, cost as much as a new font! This ignorant argument was maintained when the question arose as to restoring the old nave of St. Saviour's Church, Southwark; the estimate to restore it was 12,000*l.*; to build the present miserable nave was 8,000*l.*; but the latter really cost 12,000*l.* In an architectural and historical point of view there can be but one opinion,—viz., that the retention of an original, properly restored, is by far more valuable than an ignorant new erection.

The "Llangollen Guide" is edited and printed by Jones, of course; who else than Jones is better fitted for the task? Upon the subject of architecture he is modest. Speaking of Castle Dinas Bran, he says that "We confess we are not learned in architectural knowledge." This admission enables us to understand his assertion "that the ancient Britons had a tolerably good conception of the Gothic style," and that the roof of Llangollen Church is supported by three massive octagonal pillars. Jones's account, however, of Valle Crucis Abbey is creditable.

Llangollen Church consists of a nave, with aisles, north porch, chancel with aisles, and a tower at the west end containing four bells. This was an Early English church, with a north aisle only; a south aisle has recently been added, and the chancel and aisles have been rebuilt. The new aisle and additions are in the Decorated and Perpendicular styles; the ornamental Early English doorway (formerly external) on the south side of the church is retained as an inner doorway between the nave and new aisle. It is to be regretted that the additions were not made to accord with the original style remaining, or in the style of the day. In former times, if additions were made to our old churches, the additions were always in the new style—the style of the day: our ancestors never rebuilt in half-a-dozen styles. The tower was rebuilt about 100 years ago, and if it were again rebuilt it would be well.

The roofs over nave and north aisle in Llangollen church are original, of oak, open, and truncated, with collars, hammer-beams, carved angels, &c. The east end of the nave is ceiled with oak, and formed into panels, and enriched with ornaments. The new roofs are of deal varnished. It has been suggested that the roof of the nave formerly belonged to Valle Crucis Abbey: without documentary evidence I saw nothing to confirm this opinion.

There are a few brasses; the clerk hands the visitor a paper with the inscriptions printed thereon,—not a bad precedent to be followed by officials in churches generally; there are loose brasses handed to you to read; on this I urged that they be immediately *fixed* in their proper places, as they might be lost: this was promised to be done.

With a view to obtaining a list of all the brasses remaining throughout the United Kingdom, the British Archæological Association should issue a paper to each incumbent to fill with the number and dates of all brasses in his church. The Society of Antiquaries some years ago attempted to collect inscriptions, but did not succeed.

There is a tomb of the fifteenth century beneath an arched recess in the wall of the aisle, forming a canopy, with crocketed label, and pinnacles, springing from small attached columns. The effigy has gone; it was taken piecemeal to cure diseases in horses' eyes! It was not a founder's tomb, but belonged to the Trevor family.

Prior to leaving Llangollen: the bridge was regarded as one of the seven wonders of the world. How many seven wonders there have been! This bridge was erected in the fourteenth century by Dr. Trevor, bishop of St. Asaph; and consisted of irregular, narrow, pointed arches. The bridge is not now attractive; it has been lengthened to accommodate the railway, a toll-house added, and raised 6 ft., and now it is proposed to widen the bridge to about double its present width, which is 11 ft. 6 in. The county has promised 600*l.*, the railway company 300*l.*, and the parishioners will give 100*l.*,—total 1,000*l.* It would be, in my opinion, by far the wisest course to rebuild the bridge. There has been a market-hall erected at a cost of 3,500*l.*; the building is a great addition to the town. The architect was Mr. Pountney Smith, Shrewsbury; builder, Mr. Morris Roberts, Llangollen.

About two miles from Llangollen, on the right of the road towards Ruthin, in a sequestered valley, is Valle Crucis Abbey. The stiles, leading to the fields, on approaching the building, have two or three stone steps; these, it will be observed, are portions of the shafts of columns, fragments of the abbey. The edifice being a "Tintern Abbey in miniature," affords pleasure to ladies to sketch; this interesting work, which at one time was useful, is now much lessened by the photographer relieving the ladies of their studies. It has also been visited by several London architects of extensive practice; who, no doubt, supplied their sketch-books with abundant material for new churches. The abbey affords an illustration of the maxim that beauty is the offspring of simplicity. It is in one style of architecture, Early English, and was decorated just sufficiently to raise it above plainness, and no more. The ornamentation is really partly of a Norman character,—consequently the abbey is of a very Early English date.

It appears that this building was buried in obscurity until 1851, when, as the inscription (in Old English, cut in stone, and let into the wall of the south aisle of the nave) informs us, "the levelling and clearing of this building, with the permission of the proprietor, was commenced May 28th, 1851, and completed May 14th, 1852, under the superintendence of Arthur Viscount Dungannon, of Brynkinalt; W. W. E. Wynn, esq., of Peniarth; R. K. Penson, esq., architect, of Oswestry."

At the west doorway is a rope suspended from the apex of the arch, and a notice to the effect that the bell will be answered as soon as possible, the house being some distance. The door is not opened by a Cistercian monk, but by a lady who has for many years taken a great interest in kindly explaining all the leading points. After a request not to walk over the memorials, and a compliment for not bringing a large hamper of provisions to desecrate the spot, I was duly admitted.

The abbey, although a ruin, is by no means past restoration. The remains consist of nave, aisles, transepts with eastern aisles, chancel, and a tower at the intersection. The nave was separated from the aisles by clustered columns, with moulded bases (the bases remain *in situ*) and sculptured capitals, lying about the ruins. At the west end is a large window in three lights under one label. In the gable is a rose window in eight radiating divisions, each having a trefoil head. The west doorway externally was originally highly enriched with attached columns, having sculptured capitals and mouldings. At the west end of nave is a perfect stone staircase, with a small pointed doorway leading to the triforium, now gone. At the east end of the nave a portion of the stone staircase to the rood-loft remains.

The transepts, with their eastern aisles are especially interesting, particularly the south transept, which is more perfect than the north transept. It has the clustered columns and arches between transept and aisle remaining perfect. The arches are plain, and nearly equilateral, and have two courses of voussoirs, 9 in. wide, and over them a rough arch of slaty stone, set edgewise. The groining is partly remaining, exposing the framework of the freestone-arched ribs, and the rough manner in which the haunches were filled with blue slate. The architectural student is enabled to gain more practical knowledge of the early stage of rib-vaulting from this ruin than from any book, however minutely it may be explained.

In the west wall of the south transept is a long, narrow window-opening, formerly filled with tracery of later date; and in the south wall is a large window-opening, now filled up, formerly connected with the conventual buildings. The transepts are joined to the nave-aisles by pointed-arched openings without responds. In the transept aisles are the remains, *in situ*, of the altars, piscina, founder's tomb, aumbry, &c. The aisles are connected with the transepts by two arches, supported by moulded piers. The window openings have moulded arches, with squared freestone quoins to jambs. The north transept has the lower portion of an outer doorway, and also a stone staircase in the north wall.

The east end of the chancel has five lancet window openings,—three lower and two upper,—with labels, string-course, &c. The lower central window has attached columns with ornamental capitals. Between the chancel and north transept-aisle are the remains of a shrine. Tombs of benefactors were discovered while excavating; the remains of these are placed at the west end of the chancel. One is an incised slab of a half-length knight, in chain armour, Jenaf ap Adam, of Trevor, and fragments of his wife Myfanwy's tombstone. Another, of a lady, with the following inscription: "*Hic jacet Gweirci filia Owein cujus animæ propicietur, Deus, Amen*, 1290." On another stone is "*Edwardus filius Yo*," date thirteenth century. Loose boards are placed over these stones to avoid injury. These memorials were found under 12 ft. of earth, on which ash trees had grown during 200 years. In the north transept is a large perfect stone coffin, found filled with bones.

The walls of the abbey are constructed with the blue local slaty stone, and all columns, arch-stones, window-heads, quoins, string-courses, &c., are of wrought freestone. Ivy freely covers the ruins, and adds to their picturesque appearance. The stone corbels of the roofs of the chancel and the south transept remain perfect.

On the walls and piers of the south transept are several masons' marks, which, with the exception of two or three, may be seen engraved in the "Archæologia," vol. xxx., p. 113, illustrating a paper on "Masons' Marks on Buildings of the Middle Ages," by Mr. G. Godwin, F.R.S.

The slanting , it will be seen, occurs in St. Pierre, Poictiers, France, diagram No. 88; the six-pointed star in Gloucester Cathedral, diagram No. 11; of these there are many. Also the simple cross, and others. These masons' marks have to be searched for, being superficially and unobtrusively marked.

The east front (externally) is plain and peculiar. There are no labels, except to the lower central lancet.

In concluding the investigation of this venerable ruin, it may be observed that the student will find ample materials for his pencil,—the stone fragments placed about the spot, consisting of ornamental lily-leaved capitals, bases, corbels, chamfers, &c., well repaying him for his time and trouble; and he must not be discouraged if a countryman should ask him, whilst sketching, if his labours will pay well. The cost of the excavation was 100*l.*, and making good to the west doorway, &c., about 60*l.*

Arriving, per rail, at Corwen, and walking in a southerly direction, Llangar Church is reached. It consists of a nave, south porch, chancel, and a stone bell-turret at the west end, containing one bell. This church has been closed since 1863, except for burials; and as it may not long remain (a new church having been erected else-

* See vol. xxii., p. 718, and vol. xxiv., p. 609.

where), it will be well to record a few notes. The date of the church is late Perpendicular. The font appears to be of an earlier date, although partly placed in a Tudor-headed recess. The lid of the font is like a modern copper-lid,—date 1755. The nave windows are square-headed, with moulded mullions, filled with quarry glass. There is a gallery at the west end of the nave, and a mural marble slab against the north wall, date 1851. The altar is raised one step. The east window, in three trefoil-headed lights, with foiled panels over, is peculiar. A locker is placed in the north wall, and there are mural monuments on the south side,—dates 1710, 1712, and 1742. The pulpit is on the south side, by the chancel. The stained glass in the window is to Johannes Hughes de Cymer, *obiit* A.D. 1694. A stone staircase leads to the belfry. The hatchments and shields against the walls are in bad condition. The porch has an open roof,—date 1702. There is a sun-dial on the south side of the church.

Leaving this church, and returning to Corwen, and thence in a northerly direction, the tourist arrives at Rhug, the seat of the late Sir Robert Williames Vaughan, bart. The Vaughans of Rhug, Henwrt, and Nannau, all branches of the same family, are all lineally descended from Owen Glyndwr, whose patronymic was *Fechan*, or Vaughan—*id est*, little. The guide-books pronounce the chapel to be remarkably diminutive, and very ancient; this is not correct, as it is in what is termed the Renaissance style. This building is under one roof, 37 ft. 7 in. by 19 ft. 8 in., inside measure; the roof is open, with collars, hammer-beams, and the angels are as flat as if they were cut out of pasteboard. There is much ornament about the roof, such as bosses at the intersections, decorated with the thistle, goat, sacred monogram, and other devices. At the east end is an open screen, with crested top. At the west end is a large gallery, and beneath it an octagonal modern stone font, with quatrefoil on panel. The east window is pointed in three five-foiled lights (with five-foiled panels over), and filled with stained glass, in memory of Edward Williams Vaughan; Salesbury, Rhug, 1807; and Griffyth ap Howell Vaughan, Rhug, 1848. The altar is inclosed, and has on each side monumental shrines, with quotations from Scripture in panels. The walls are covered with carvings and frescoes, which are fading. On the tie-beam over the east window is the sacred monogram and 1637. The altar table has an inscription in Welsh, and the sacred monogram. On each side of the chapel are open benches; at the base (on riser to seats) are carvings of grotesque animals in relief, also flowing stems with fruit and foliage. The chandelier, suspended from the roof, is an oddity: it consists of two tiers of imitation candles, painted. All the windows are new, of Perpendicular character. The pulpit is within the screen on the north side, with Welsh scriptural inscriptions in the panels. The sides of the chapel are lined with oak wainscotting, with carvings on rails. Rhug chapel is more interesting to the antiquary than the architect, being more curious than useful. Westward of the chapel is a large cross, erected, it is said, in memory of a favourite horse!

Returning to Corwen, and journeying per rail through Cynwyd, Llandrello, and Llanderfel, the tourist arrives at Bala. The lake is well known, and speaks for itself. The town is small, clean, and neat, principally inhabited by Welsh woollen cloth and linsey manufacturers. The taste at some of the hotels is startling,—bright green mouldings on French white grounds. On the ugly townhall is a clock turret; it has just been added, with a notification that it was erected "in honour of John Jones, esq., Trencyata, 1868."

The parish church is at Llanycil, a mile distant. Here a surprise was offered: the Rev. Mr. Evans had directed a woman to attend with the key wearing the old and formidable Welsh hat, now almost a matter of history. The key itself is curious, 8½ in. long, ⅛ of an inch diameter, with $\frac{R\ R}{O\ H}$ on one side and 1785 on the other, and L Y in the wards. The plan of the church is a parallelogram, 71 ft. by 21 ft. 9 in.; the date Perpendicular. It consists of nave, chancel, north porch, and bell-turret with one bell; roof ceiled, windows mere openings. The font is modern, a tall stone stem with basin. Part of the old font is lying loosely on the floor; it was octagonal, with water drain; a modern gallery at the west end; the pulpit is hexagonal, on the south side, with a brass plate to Elizabeth, wife of Mr. E. Jones, curate, date 1770; mural marble monuments on south side, dates 1726, 1758, and 1824. There are two old benches, with carved finials. The east window is pointed, and in three trefoiled lights, with three foiled lights over, filled with a memorial of painted and stained glass, put up by Robert Anwylad, 1855, to David Anwyl Piscock, 1831. A plain open screen between nave and chancel; altar enclosed with an oak balustrade, date on gate 1739; two boxes padlocked, date 1756. On the back of a bench is 1657. The altar table has D. R. (David Roberts), 1739 upon it; and on a box beneath, J. D., R. K., 1751. The decalogue is in Welsh. In the churchyard are objects of interest; there is a lych-gate, with an open-timbered roof. On the south side of the church are stone tombs, sculptured with columns and arches in relief, date 1695. On a stone let into the south wall is HWY PERYCLOD NA HOEDL, on a shield, date 1671. There is also an ancient incised slab, with a sculptured half effigy, used as a base for a modern tomb. At the east end of the church is an altar tomb of great interest to Calvinistic Methodists, viz., to the Rev. Thomas Charles, B.A., of Bala, who died October 5th, 1814, aged fifty-nine. He prepared two editions of the Welsh Bible, compiled a Welsh scriptural dictionary, in four vols., and he had an important part in originating the British and Foreign Bible Society. There are eight yew trees in the churchyard. At funerals a leaden bowl is handed by the clerk at the grave to receive contributions towards digging the grave and tolling the bell.

Starting from Corwen to Cerig-y-Druidion (noticed in a former paper) over a mountain in an easterly direction, Llanfihangel church is to be seen; comprising a nave 41 ft. 2 in. by 12 ft. 11 in., south porch, bell-turret containing one bell, and a chancel 22 ft. 11 in. by 14 ft. 11 in. inside measure. The roof of the nave is of oak and open. Gallery at west end. Font modern, date 1853. The seats are open. Deal brackets against walls for candles. On a bench is "Hugh Davies s [his] bench, 1753." The roof of the chancel is ceiled. The pulpit is octagonal; it is on the south side. The altar is enclosed with railing; the decalogue is in Welsh. The table is old. There is a brass in the floor to "Alice Davies, daughter of David Davies, rector of this parish, 1771." This church stands on the side of the river Alwyne; about 1709 it overflowed, and the flood mark is still traceable 8 ft. 7 in. above the floor of the chancel.

On returning from Llanfihangel and alighting on the top of the mountain at Tai Drall, a good specimen of an old farm-house closes the note-book of the present trip. In this farm-house the kitchen is 21 ft. 8 in. by 17 ft., including the chimney. There is accommodation between the jambs under the chimney for a large party; and here the farmers smoke, being a great benefit to those who have to sit in the room. The clock is of pure brass (in a tall case), inscribed, "Hampson, Wrexham, 1528," and ornamented in the angles. There is an old oak chair, and other antiquities. One of the daughters produced a tin horn, 3 ft. 7 in. long, used to announce the dinner-hour, and sent a fine blow over the mountains, distinctly heard for two miles. The result of venturing upon a blast was a sound similar to the squeak of a pig, proving that London lungs cannot compete with those of the mountain maidens.

W. P. GRIFFITH.

EXPLOSIONS AND OTHER ACCIDENTS BY FIRE.

EXPLOSIONS have been very frequent of late, as well as other accidents by fire.

A serious accident has occurred at the Foaty Station of the Queenstown Railway, in Ireland. Workmen are engaged nightly repairing an adjoining viaduct. As three of the men were filling the lamps with which they were furnished from a cask of paraffine, a spark ignited the oil, and a fearful explosion ensued. The men were dreadfully burned, and their lives, we learn, are despaired of.

A terrible disaster has occurred at Metz, on the Moselle. A loud explosion took place in the cartridge manufactory situated in the court of the arsenal. The number of persons employed in the place at the time was 109, the workshop being constructed of wood, and consisting of two rooms. In the first were 71 women, and in other 14; there were also 10 foot-chasseurs, 10 artificers, 3 sub-intendents, and an inspector engaged in the same employment. A young workwoman, it appears, in throwing a pair of scissors to one of her companions, struck the point of the instruments on the capsule of a cartridge, and so caused the explosion. In a moment a formidable detonation was heard; the woodwork of the building was blown to pieces, and the roof fell in. The fire having communicated to the heaps of cartridges, made in a few moments fearful havoc amongst the persons present. The court of the arsenal after the accident presented in some sort the appearance of a field of battle, being covered with dead, dying, and wounded. From beneath the burning *débris* 16 dead bodies were withdrawn, so calcined and mutilated as not to be recognisable, and 59 persons dreadfully injured and bruised lay on the ground until they could be conveyed to the hospital. The fire was soon extinguished, and by activity and courage further calamities were averted, as from under the ruins of the burning planks several barrels of gunpowder and of cartridges were got out, which the slightest spark would have caused to explode. The Minister of the Interior immediately forwarded 10,000fr. for the families of the victims. The Emperor also at once sent word that both he and the Empress were prepared to give ample assistance in such cases as might be brought to his knowledge.

One of the most extensive fires that has been witnessed in Dublin for many years broke out lately in the timber-yard of Mr. Michael Meade, of Great Brunswick-street. The greater portion of the ground was covered with two-storied sheds, in which were considerable stores of timber, and steam sawing, moulding, and planing mills were erected on an extensive scale. There were also several large piles of valuable timber outside the sheds. The fire broke out from the roof of one of the sheds, and in a very few minutes after the whole of the stores were in a blaze. The entire premises and contents were destroyed. The origin of the fire is unknown.

A similar fire has occurred in a number of contiguous timber-yards in Lauriston Park, Edinburgh. The enclosures included five joiners' yards, in one of which the fire is believed to have originated. A large quantity of timber and joinering work, with several offices and their contents, have been wholly destroyed.

At Coxhoe, while a man was standing with his back to a burning brick-kiln, the wall of red hot bricks gave way and buried him. He was brought out from beneath the *débris* as soon as possible, but expired shortly after being rescued.

FROM AUSTRALIA.

Melbourne, Victoria.—The design for the Church of the Immaculate Conception, Grace Park, Hawthorn, by Messrs. Crouch & Wilson, of Melbourne, was selected from about twelve or thirteen which were submitted in competition. It is in the Decorated style, and exhibits a church 119 ft. long, and 53 ft. 6 in. wide, comprising nave, aisles, transept, chancel, lady-chapel and vestry, and tower and spire. The whole building, when completed, is calculated to afford accommodation for nearly 1,000 persons. The width of the nave is 24 ft. from centre to centre of columns, which support a clearstory roof, rising to the height of 51 ft. 6 in. from the finished floor-line. The transept is 24 ft. wide, and 54 ft. long in the clear between the walls; the chancel, 23 ft. wide and 30 ft. deep; lady-chapel, 12 ft. by 20 ft.; vestry, nearly same size. Five entrances have been provided. The tower is 18 ft. square at base, and is nearly 170 ft. high to the top of vane on spire. It is not at present intended to go higher than about 60 ft. The walls will be of bluestone, in random uncoursed rubble, with tracery mouldings, weatherings, gables, and other dressings in best white freestone. The estimated cost of the entire design is about 8,000*l*.

A rapid increase of buildings of every description, simultaneously with the establishment of valuable industries, is perhaps one of the best proofs that can be given of the progress of a young country. Such proofs of progress Melbourne is now more than ever displaying. The *Australian News*, in an article on architectural improvements in Melbourne and the suburbs, says:—

"Nearly all those rude structures which the climate and materials to hand twenty years ago compelled Victorians to adopt, have been superseded by buildings in the erection of which much taste, as well as a regard for the comfort and health of their occupants, has been displayed.

Side by side with these dwellings have sprung up ecclesiastical edifices, public buildings, and commodious stores, which, as architectural compositions, possess considerable merit, and denote very strikingly the wealth and industry of an enterprising population. A very large majority of the buildings now in progress, especially dwelling-houses, have been commenced during the past few months, or subsequent to the time when a reduction in the rate of bank interest took place. A great impetus has been given to the building trade; and, although the number of houses which have been built within the city during the past three months greatly exceeds those erected in any corresponding period of 1867, it is chiefly in the suburbs that the spare cash of the wealthy and the hard earnings of the industrious have been expended. The following statement shows the increase in the number of the population in the city, including Bourke, Gipps, Latrobe, Lonsdale, and Smith Wards, from 1861 to 1867, ending March of each year, together with the increase of houses, and their annual rateable value:—

Year.	Houses.	Value.	Population.
1861.....	8250	£652,676	37,165
1862.....	8619	581,774	38,785
1863.....	8814	555,708	39,663
1864.....	8896	550,998	40,005
1865.....	9052	569,483	40,734
1866.....	9452	595,265	42,534
1867.....	9722	613,655	43,749

The present total number of houses is estimated at 10,200, thus showing that during the last twelve months the buildings erected in Melbourne exceed by 500 those built in any preceding year since 1861. A much larger number of buildings have, however, been erected during the first four months of the present year than in the corresponding period of 1867. In that portion of the city and those districts which come under the provisions of the Building Act, the number of buildings erected in the first four months of 1867 was sixty-nine, whilst 107, nearly double the number, were erected in the first four months of 1868. And though this increase, as compared with what has taken place in some of the suburban districts, is insignificant, the advancement, made from an architectural point of view, is great.

It would be tedious to enumerate the names of the streets in Melbourne in which new buildings have been erected since the commencement of the present year. There is scarcely a street or lane in Melbourne or its suburbs in which one or more houses have not been built within the last few months, or are now in course of erection. A good class of houses which have cost from 500*l.* to 1,000*l.*, exclusive of the land, have been erected at Jolimont by Messrs. Leslie, Abraham, and Willoughby, and Mrs. Lush; at East Melbourne, by Messrs. M'Kenzie, Wilmott, and Grey; and at West Melbourne, by Messrs. Turnbull, Hill, and Cooper. In many other districts, more particularly in the suburbs, handsome villa residences have been built, and it is gratifying to notice that the more humble dwellings are of a much better class than those erected in former years.

In nearly every part of that immense and important wing of the metropolis, Collingwood, all classes of buildings are now being erected. In Smith-street alone, over 20,000*l.* has been spent for building purposes during the last six months.

The change which Emerald-hill has undergone during the last eighteen months is also great. The buildings completed in that period are of a better class than most of those erected during previous years. The number of houses in June, 1867, was 2,250; since then about 1,500 have been added, a large portion of which have been but recently completed, or are yet in course of erection."

Bendigo (*Sandhurst*).—The orderly-room for the Bendigo Volunteer Rifles has been erected by Captains Taylor and Joseph, of the corps. The architects were Messrs. Vahland & Getzschmann; the contractors, Messrs. Webb & Harlow; and the clerk of the works, Sergeant Fly. The room is 70 ft. by 36 ft. inside, and the walls 22 ft. high. The style of architecture is Modern Ornamental Italian. The foundations are of granite, and the walls of white and red ornamental bricks. The hammerbeam roof, wrought, stop-chamfered, and varnished, is covered with corrugated iron, and has five ornamental ventilators on each side. The building cost 700*l.*

Ballarat.—The foundation stone of the new Primitive Methodist Church, Eyre-street, Ballarat, has been laid. The expense of the new building is estimated at about 1,400*l.* The design has been furnished by Mr. Doane, architect. It will be of oblong shape, the dimensions being 57 ft. by 35 ft. on the outside, and capable of accommodating 325 persons. It will be in the Corinthian order; the front facing Eyre-street to have a large pediment supported by fluted columns with carved capitals, with pilasters at the angles, with circular-headed windows at the sides.——About four months ago the council invited competitive designs from architects for a new Town-hall for Ballarat West, and at the fixed date they received fourteen plans. The councillors determined to leave the awarding of the prizes to competent judges, and therefore Messrs. Terry & Billing, two of the leading Melbourne architects, were requested to adjudicate upon the merits of the submitted plans. In compliance with this request, these two gentlemen examined the plans carefully, and submitted a report to the council, which was immediately adopted. On opening the envelopes containing the names of the successful candidates it was found that the winner of the first prize of 100*l.* was Mr. H. R. Caselli, a gentleman who has for many years successfully followed the profession of an architect in Ballarat. The second prize of 50*l.* was awarded to Mr. Oakden, of Melbourne. The council were much pleased with a plan by Mr. J. T. Lorenz, a gentleman who has lately established himself as an architect in Ballarat, and therefore purchased his plan for 30*l.* The council in their instructions to architects had stated that, if in other respects suitable, the preference would be given to the plan that should leave the largest frontage for shops. In Mr. Caselli's plan only 20 ft. are taken up by the main entrance, and the superior convenience and good effect of the interior arrangements were especially commended by the judges. But Mr. Lorenz's plan included a clock tower, which feature Mr. Caselli had declared he could not erect for the amount to be expended now, namely, 6,000*l.* Several lively meetings and protracted debates have taken place in the borough council with regard to the different plans.——A peal of eight bronze bells, in the key of E flat, is about to be cast by Messrs. Mears & Stainbank, of Whitechapel, the result of a subscription of the inhabitants of Ballarat, to commemorate the happy deliverance of the Duke of Edinburgh from the assassin. The tenor bell is to weigh 23 cwt. It is expected that the Duke and other members of the royal family will witness the process of casting. It is suggested to us from more than one quarter that the committee would do well to obtain a peal of bells the tenor of which should weigh at least 30 cwt., in order to secure dignity of tone.

Bengeo.—The ceiling of Bengeo Church has been removed, owing to the plaster having fallen away in places, and match-boarding has been substituted. The boarding has been stained, so as to resemble the other portions of the church.

Adelaide.—The cathedral for the diocese of Adelaide is to be begun forthwith, and the stone is expected to be laid in December next, when the bishop will have completed a residence of twenty-one years in South Australia. The designs are furnished by Mr. Butterfield, and the cost of the first portion is to be 10,000*l.*

Sydney, New South Wales.—A glass manufactory has been established in New South Wales. The premises are situated on leased land about an acre in extent, abutting upon the Camperdown-road, and midway between the Newtown and Parramatta roads. The buildings consist of a furnace-house, store-sheds, pot-rooms, and workmen's cottages. The fire-hole furnace is constructed on what is said to be the American principle. It is a quadrangular building, arched at the top, fed with fuel in the centre, and has at each corner a low flue. By having the flues so placed the heat is conducted to every part of the furnace. The draught is obtained by the ordinary cave. The furnace of five holes is capable of giving employment to fifteen blowers.

An Australian Scholarship. — An item of Australian interest appears in that unpromising source, the Tasmanian *Government Gazette*. Despatches from Downing-street inform the governor that a scholarship in the University of London, for Australian youths, has been offered by the trustees of the Gilchrist Educational Trust. This scholarship is of the annual value of 100*l.*, and is tenable for three years. It will be annually awarded to a candidate resident in, and a native of, Australia, who shall have graduated in arts either in the University of Sydney, or in the University of Melbourne, and who shall be desirous of pursuing a further course of academical study in Great Britain under certain conditions.

POSSINGWORTH MANOR.

THE building which we illustrate has been erected for Mr. Louis Huth, at Possingworth, about six miles from Uckfield, on the London and Brighton Railway. The house is situated on ground rapidly falling to the south, commanding extensive views, and is screened at the back by a belt of fir trees. The materials used in the construction of the house are red brick, with Bath stone dressings, and slated roofs.

The principal rooms on the ground-floor are the hall, dining-room, morning-room, drawing-room, picture-gallery, and conservatory. In the centre of the building is a quadrangle, entered under a gate-house, by which access is gained to the porch, forming the principal entrance.

The hall, which forms the south side of the quadrangle, is 50 ft. by 20 ft. in the clear, and 40 ft. to the underside of ridge-piece, with an open timber roof. In the hall are the principal staircase, entirely of oak, with carved panels, an ornamental chimneypiece 15 ft. high by 9 ft wide, and several stained-glass windows by Lavers & Barraud, the one at the end of the hall having representations of the Seasons, the bay window on the north side the Months, and the other windows various subjects. At the end of the hall is a gallery for musicians or for lookers on.

The dining-room is 38 ft. long by 22 ft. 6 in. wide by 16 ft. high, and is entered directly from the hall. In this room are a large bay window, 17 ft. by 8 ft. inside; a recess, opposite the bay, in which is a carved oak sideboard, specially designed by the architect; a chimneypiece, carved in Mansfield Woodhouse stone, and an elaborate ceiling. From this room leads the southern turret, forming a recess on the ground-floor, and from the top of which a fine view of the country is obtained.

To the west of the dining-room and south of the hall, from which it leads directly, is the morning-room, 25 ft. by 22 ft. On the south side are steps into the garden. The drawing-room is 43 ft. by 30 ft., exclusive of two bays, each 17 ft. wide by 7 ft. 6 in. The walls are all panelled in oak, and the ceiling is elaborate. Between this room and the picture gallery is a fine flight of steps, leading into the garden, the balustrading to which is of pierced stonework.

On the west of the quadrangle is a corridor, next which is the picture gallery, 60 ft. long by 23 ft. wide, by 22 ft. high. The ceiling is trabeated, the panels being of open ironwork, between carved and moulded oak beams, supporting the glass, forming the inner ceiling of the gallery, which is lighted from above; the beams rest on ornamental brackets, which are supported by corbelled heads, carved by Phyffers. The gallery leads from a triple-arched doorway on the west side into the conservatory, which is composed solely of glass and iron. The roofing of glass is supported on iron columns with ornamental cappings, and is crowned by a light glass and iron dome. To the north of the picture gallery and conservatory is Mr. Huth's room, 43 ft. by 20 ft., with a bay at the west end, and a polygonal bay on the north.

The whole of the east wing of the building, about 100 ft. by 70 ft., is occupied by the kitchen and its offices. The kitchen itself is 36 ft. by 18 ft., by 24 ft. high, with an open roof, crowned by a lofty turret. It is fitted up with cooking apparatus, plate-warmers, ovens, &c. Round it are placed the larder, scullery, dairy, yard, servants' hall, and so on. There are four water-closets on the ground-floor.

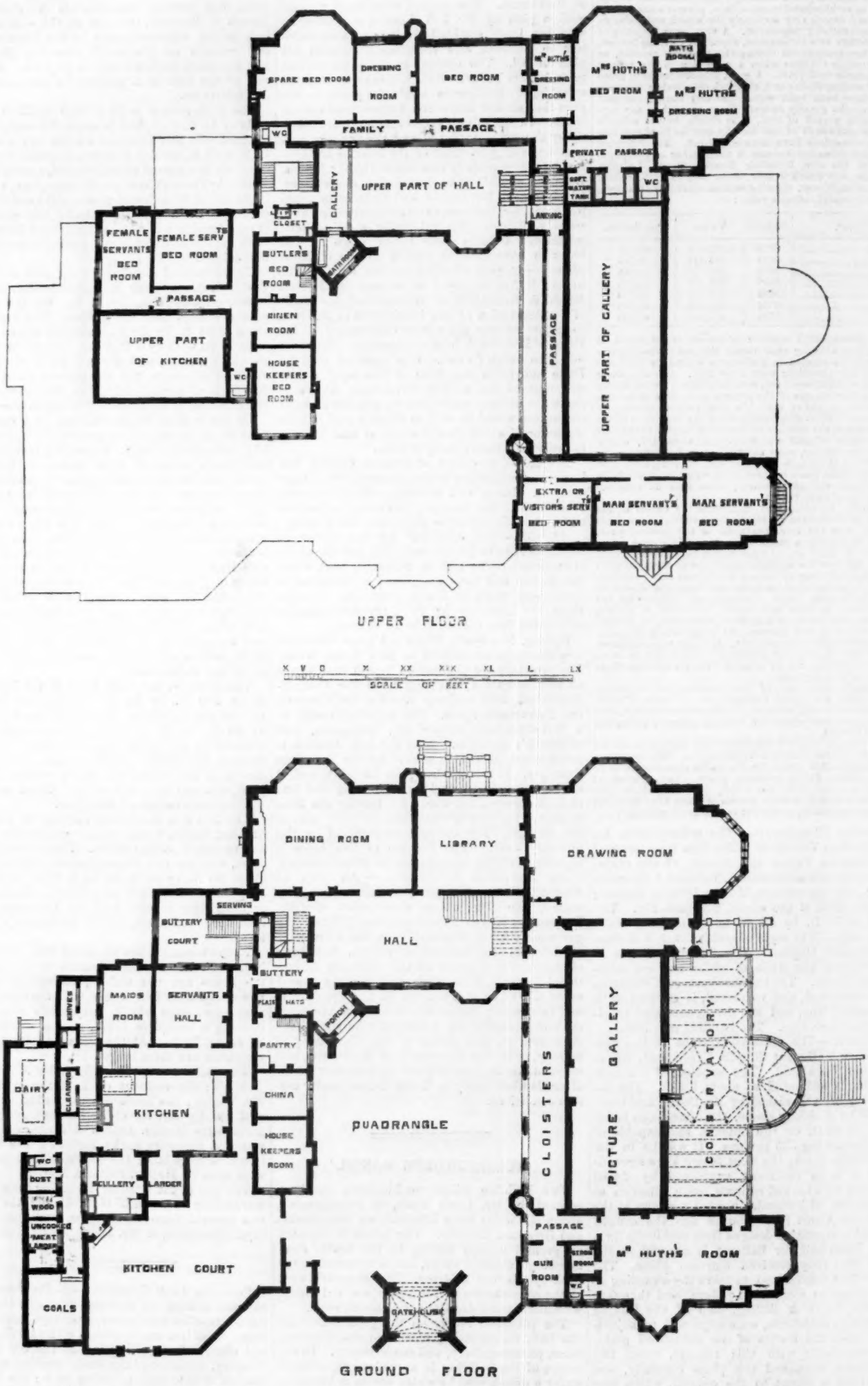
The first floor is devoted entirely to bed and dressing rooms, with a bath-room over the porch, and various domestic offices. The principal bedroom, with its two dressing-rooms adjoining, is about 50 ft. by 30 ft., by 12 ft. 6 in. high; the other rooms are in like proportion. The second or attic floor is also used for bedrooms; the rooms are 10 ft. high, and of various superficial areas.

In the basement are extensive coal, wine, and beer cellars. At some distance to the east of the house are the stables, containing coach-house, stalls for four horses, six loose boxes, harness-room, open sheds, carpenter's shop, &c., forming a complete block, and a stable-yard, 80 ft. by 70 ft. At the different entrances to the estate are three lodges.

The builder was Mr. Alexander Cheale, of Uckfield; the resident clerk of the works was Mr. Winter; the landscape gardening was carried out by Mr. Marnock; the hydraulic engineers were Messrs. Easton & Amos, who have executed extensive works, including the formation of a large lake; the ironwork and heating were done by Messrs. Potter & Son.

The cost of the building, including the stables, was slightly in excess of 60,000*l.*; and the whole was erected from the designs, and under the superintendence, of Mr. Digby Wyatt, F.S.A.

SOOTFALL FROM CHIMNEYS.—A Peckham correspondent suggests the suspension of a *bunch* of light attractive substances,—perhaps *feathers*,—from a small iron bar, furnished with a small *pulley* and chain,—for working it,—at the top of the chimney, to *intercept* the smoke passing up, and convert it into soot adhering to it; the bunch in question, or "soot-collector," to be lowered down, by means of the pulley and chain, from time to time, and cleared, and rehoisted for a fresh collection. The bunch, or "collector," to be somewhat less in bulk than the area of the flues, so as not to interfere with the draught.



POSSINGWORTH, SUSSEX.

MANSION AT POSSINGWORTH, SUSSEX: THE SEAT OF MR. LOUIS HUTH.—MR. M. D. WYATT, ARCHITECT.

A SOUTH LONDON WORKING-CLASS EXHIBITION FOR 1869.

A CROWDED meeting has been held in the Congregational Church, Borough-road, for the purpose of promoting a South London Working Class Exhibition for 1869, and of explaining the prize scheme in connexion with the series of scientific lectures to be delivered at the Lambeth Baths during the ensuing winter. The chair was taken by Mr. Thomas Hughes, M.P.

The Rev. G. M. Murphy read the programme of the lectures and prizes, and the proposed prospectus of the Exhibition, of which, among others, Lord Shaftesbury, Mr. Gladstone, and Mr. Bright are to be requested to become patrons.

Mr. Hughes said he believed that the objects of industrial exhibitions were, in the first place, to make individual workmen better acquainted with the principles of their own particular handicraft. After that, there was this further object,—to make men not only understand and take an interest in the craft by which they got their living, but to enable them to recognise and appreciate good work performed by other artisans. That being so, what did it come to? It came to this,—that we were providing them, or doing all we could to provide them, with technical education, and to promote it in the country. The programme of scientific lectures and the proposal of Mr. Twining as to prizes, formed an excellent leading up to the Industrial Exhibition for 1869. In foreign countries, and especially in Germany, there was a far better technical education and scientific instruction given to the people than there was at home in England. Surely it was high time that state of things should cease. There were many other things in which the English people were behind other nations besides mere mechanics. There were, for instance, the laws of form and colour, the knowledge of which added incalculably to the value of the work of skilled artisans. He hoped these matters would be attended to. It had been objected that, in a country like this where labour was so subdivided, instruction of this kind was likely to make men discontented. He did not believe a word of that. No doubt it was said, "Let the cobbler stick to his last." Yes; but let him know how to use his last to the best advantage. After all these things a good deal remained to be done.

Resolutions approving the programme of the scientific lectures and the proposal for the Exhibition were passed.

RAILWAY MATTERS.

THERE has been a private inspection of the Western Extension of the Metropolitan Railway, preparatory to the opening of the line for public traffic on the 1st of October next. This line leaves the existing route of the Metropolitan Railway at about 200 yards from the Edgware-road station, continuing its course down Praed-street until opposite the Great Western Hotel, where a commodious station has been erected. A subway for passengers will be formed from this station to that of the Great Western. The line proceeds from this Paddington station to Queen's road, Bayswater, where the second terminus has been erected. Leaving Bayswater, the line proceeds to Notting-hill-gate, where the third station is situate; and thence the district of Kensington is traversed until the fourth station is reached. This has been erected in the High-street, almost immediately opposite to the vestry-hall. This station will be the terminus of the Metropolitan District Railway, which, it may be remembered, will run from the Thames Embankment, through Pimlico and Chelsea, to Kensington. The Kensington High-street station will be jointly used by both companies. From here the Western Extension proceeds to Gloucester-road, Brompton, where for the present it will terminate. When complete, however, it will continue its course some half-mile further to Cromwell-road, Brompton, the Metropolitan District and Extension lines running parallel with each other from Kensington High-street to the Cromwell-road. By the new line passengers will be able to travel from within a short distance of the South Kensington Museum to Moorgate-street in about thirty-three minutes. At present the fares have only been arranged from the City to Notting-hill-gate, and the charges fixed between these points is eightpence, sixpence, and fourpence, or one shilling, ninepence, and sixpence for return tickets. Ninety trains are to travel each way per day, commencing at five o'clock in the morning, and continuing until midnight. In compliance with the provisions of the Act of Parliament, workmen's trains will run every day conveying passengers between Notting-hill and Moorgate-street, at a uniform fare of twopence.

Another accident has happened to the Irish mail train since the recent dreadful catastrophe. On the night of Friday before last, as it was entering Chester station from London, it ran into a goods train standing in a siding, the points of which had been left open. Fortunately the mail train was proceeding at a very slow rate, and the damage was confined to the breakage of one or two of the wagons. The mail engine got off the line, but no person was injured. Another collision on the Chester and Holyhead line has occurred near Holyhead by the running of an express train into part of a goods train, smashing the trucks and throwing them off the line.

The shaft of the tunnel near Penge, on the London, Chatham, and Dover Railway, has fallen in, and for a time it completely blocked up both lines. The occurrence was fortunately soon discovered, and nothing serious resulted. The up and down traffic of the tunnel has since been carried on on a single line.

The station at Belfort (Haut-Rhin), the extremity of the branch of the Paris and Mediterranean railway in the direction of Switzerland, has just been burnt down. Thirty-seven trucks, loaded with merchandise, were totally destroyed, with their contents. The rapidity with which the fire spread, from the nature of the goods (a great part being oil) and the scarcity of water, prevented anything being saved. Nothing is known as to the cause of the disaster.

The traffic receipts of railways in the United Kingdom amounted, for the week ending September 5th, on 13,350 miles, to 857,031*l.*, and for the corresponding week of last year, on 13,008 miles, to 817,374*l.*, showing an increase of 342 miles and of 39,657*l.*

Railway travelling is a little exciting in America. The Indians recently in New Mexico stopped a train, burnt it, and scalped the engine-driver, stoker, six guards, and all the passengers.

SANITARY MATTERS.

THE vestry of St. Pancras have lately had occasion to complain to the New River Company of the very impure state of the water supplied by the company for watering some of the roads of the parish. On the officers of the vestry investigating the matter, it appeared that the supply was obtained from the Highgate ponds, into which there is "a flow of house drainage and an accumulation of black filth." The New River Company, in answer to the complaints of the vestry, call upon that body to construct drains to intercept the sewage, which has now become intolerable in the neighbourhood, and prejudicially affects the water used by the company for non-domestic purposes.

The sanitary condition of Truro, at the present moment, is said to be in the highest degree unsatisfactory. There is a regular nest of typhoid fever in the centre of the town; and why is this? "The answer is," says the *Cornwall Gazette*, "bad drainage and inadequate supply of pure water. Who can be astonished at an outbreak of typhoid fever who passes over Lemon Bridge or Lemon Quay? The river above the bridge is no better than an open cesspool, and that abomination which the town authorities permit in the pig-market reqnires to be smelt to be appreciated. The system of sewerage, too, is radically bad. As a rule there are no drain-pipes; the sewage, as a matter of course, is to a great extent retained in the clay subsoil, and under favourable atmospheric conditions gives forth noxious fever-bearing vapours. The long drought and great heat have produced these favourable conditions, and the consequence is the present unfortunate prevalence of typhoid."

A visitor in Lincoln, from the Antipodes, says,—

"There is one thing calculated to drive a stranger away as speedily as possible, and that is the dreadful effluvia arising from the great open sewer which, with its black fetid stream, flows through the heart of the city, and renders the atmosphere insufferable. That such a nuisance should be permitted to exist, when sanitary precautions are so generally adopted, is most astonishing, and the more so when the fatal effects of such negligence are so apparent; for I am given to understand that the rate of mortality in Lincoln is very high, if not the highest in all England. Can this be wondered at? It appears strange, however, that, even allowing the authorities of the place to be too indifferent or supine to correct the evil, the medical men do not one and all cry out against it, and let their protest be heard as loud as the Great Tom of Lincoln.

The canal, now converted into a common sewer, if returned to its original state, would bring health instead of disease; and why should not this be done? and in place of using it as a sewer, let proper ones be made, as in other places."

A Norwich medical man writes to the *Norfolk Chronicle* as to what he calls privy bins, of which he approves, yet of the state of which he complains:—

"At the White Hart, in St. Miles'," (he says), "the neighbouring cottages were rendered unhealthy by percolation from a bin which, by the carelessness of the tenant, contained a mass of floating ordure. Also in the Staff-of-Life Yard, in St. Edmund's, which I visited in consequence of a case of malignant scarlet fever having occurred in it, I found a similar condition in a bin which was the only accommodation for more than sixty persons, whose only water supply was from a superficial well in the same yard. Our local death-rate for the quarter will be a heavy one, from diseases which medical science believes to be preventible. My object in writing this letter is simply to ventilate the importance of the plain sanitary axiom, of keeping decaying organic matter from the contact of water, and, as at this time diseases from preventible causes are unusually prevalent, to recommend to the city's executive an immediate and searching inspection of the bins of the city."

Under such circumstances it was scarcely to be expected that the writer should speak approvingly of the "earth closet" system, even although, as he says, "nothing is more simple and easy than to render a privy bin harmless until it is required to be emptied, provided that its legitimate purpose be adhered to." It is (amongst other reasons) because earth closets are not likely to be properly attended to that they ought to be disapproved of in towns.

COMPETITIONS.

Otley.—New Mechanics' Hall.—About nineteen different designs were submitted for competition by architects from Leeds, Bradford, and other places. The whole of the designs were sent in under motto. The committee, in their selection, have been guided principally by the amount of money at their disposal. The subscriptions already promised amount to just over 3,000*l.*, and the committee are anxious that the new building, when erected, shall be free from debt. The design and plans selected have been prepared by Mr. Charles Fowler, architect, Leeds. The design is Italian, and the following are the chief features of the internal arrangements:—On the ground floor there will be a small lecture-room, capable of holding about 250 persons, and which, if found desirable, may be divided into two class-rooms; there will also be retiring-rooms, reading-room, library, two class-rooms and lavatory, &c. The basement will contain kitchens, scullery, chemical class-room, heating apparatus, &c. On the first-floor will be the large hall, with gallery, platform, and orchestra, and space for organ. There will also be a librarian's residence attached to the premises. The large hall, including gallery and orchestra, will be capable of seating about 1,000 persons. There will be two staircases and three separate entrances and exits into and from the large lecture-hall, which will be very useful on occasions of large assemblies, or in case of any panic or pressure. The building is intended to be built of stone, at an estimated cost of about 3,000*l.*

THE NEW ALLIANCE BANK BUILDINGS, LIVERPOOL.

THE new buildings in Castle-street are now rapidly approaching completion. They have been erected from designs furnished by Messrs. Lucy & Littler, of Liverpool, architects; Messrs. Holme & Nicol, of Liverpool, being the contractors. The building, which is erected in the Italian style of architecture, partaking to a considerable extent of the Venetian type, is square in form, the dimensions being about 70 ft. each way. The edifice has three prominent elevations, the principal façade facing Castle-street. This elevation, from the street level to the extreme summit of the balustrade, is 68 ft. high; the ornamental chimneys, which are carried to a considerable further height, increasing the entire altitude. There is a good deal of carving and sculptural ornamentation on the whole face of this elevation. The main central entrance is one of the prominent features in the façade.

It is upwards of 6 yards in height from the street level to the top of a projecting canopy by which it is capped, and the passage through it into the bank is nearly 3 yards in width, the inner sides of the entrance, as well as the top, being faced with polished grey granite. Circular-headed windows pervade the elevation, between which, in the third story, are semi-fluted columns and pilasters. The James-street elevation is uniform in height and general architectural character with that of Castle-street, though not so elaborately decorated. The Lower Castle-street elevation may be regarded, to some extent, as the rear of the building, and has not the same architectural pretensions, so far as regards artistic finish and decoration. In the construction of the building, stone from the Cefn quarries in Wales has been exclusively used. The whole of the ground floor and also all the sub-basement, with the exception of two apartments which it is intended to let off as offices, will be exclusively devoted to the purposes of the bank proper. The bank is a spacious apartment, its dimensions being 64 ft. by 65 ft., and containing altogether an area of more than 400 square yards. The ground-floor also contains the board-room, manager's room, tellers' rooms, besides other private and clerks' rooms. In the centre of the apartment there are four ornamental columns, the basement from which they spring being of stone, whilst the columns themselves are of Derbyshire marble, and are surmounted by Corinthian capitals. The walls are also ornamented by fourteen pilasters, composed of Derbyshire marble, between which will be highly decorated panelling. Although the light will be chiefly obtained from the windows in the James-street and Lower Castle-street elevation, it will be considerably added to by that proceeding from the dome, which will be inclosed and ornamented by eight stained-glass circular windows. The dome is not so large as that in the Exchange News-room. The ceiling and walls are being ornamented in stucco work, with festoons, grouping of figures, fruit, flowers, and sculptured classical heads, being in this respect a reflex of the carved work on the exterior, and will be finished in delicate painted colours, enriched by gilding. The bank floor is composed of polished oak, whilst the whole of the apartment will be heated by hot-water pipes running round the walls, the apparatus for effecting which will be in the basement. The interior of the bank floor, as well as the upper stories, approaches completion. The sub-contractors with Messrs. Holme & Nicol for the several portions of the works are Mr. Demster, of Liverpool, who has executed the stonework; Mr. Green, of Manchester, the carving and sculpture; Mr. Thomas Jones, of Liverpool, the slating, plastering, and the whole of the modelling and interior stucco work; and Mr. Merrick, of Manchester, the plumbing and glazing. Mr. Kitchen, of Liverpool, has superintended the whole as clerk of the works.

THE SCIENCE OF COLOUR.

As opinions are frequently expressed on the subject of light and colour which betray an entire ignorance of the very first principles of the science of light,—a science which has already opened to us a more beautiful and wonderful view into the mysterious constitution of the universe than any other, and has been the parent of innumerable discoveries and inventions of the highest interest in every department of science and art,—Mr. Cave Thomas deserves thanks for calling your readers' attention to it by his letter in the last number of the *Builder*.

It may be safely said that no man with any capacity for reasoning, who knows what has been found out about light, can doubt the truth of the undulatory theory. It is now known that light is nothing but inconceivably minute waves or shocks of transverse vibration, arising in certain cases about the atoms of bodies, and transmitted with extreme velocity through an all-pervading etherial medium; that these waves differ from each other in nothing but their lengths or periods of vibration; that when they traverse any material body, as air, water, or glass, their velocity (which is alike for all through the perfectly elastic homogeneous free ether in the interstellar spaces) is less for the shorter waves than for the longer, whence arises the difference of refraction; and that, when they fall on the retina, the waves of different periods excite different sensations of colour. The magnificent assemblage of colours which constitute the complete and pure prismatic spectrum is produced when a series of the waves of light of all the different wave-periods fall in order side by side on the retina; and what we call "the colours" of the various bodies we behold are nothing but combinations of the sensations excited by the mixtures of the different kinds of waves which those bodies reflect or transmit to the eye. The term "ray" merely imports an imaginary line, perpendicular to the surface of the wave, in which direction it everywhere spreads; and when we speak of "coloured rays" or "coloured light" as white, yellow, or red, nothing more must be understood than such a compound of innumerable luminiferous waves as produces on the retina the sensation of white, yellow, or red, or whatever other colour it may be.

I mention these points, not as unknown to your correspondent, but because he seems to suppose that the discussion in your columns has arisen from some æsthetic theory, in part, at least, inconsistent with the undulatory theory; and I should be sorry to have it supposed that I am chargeable with the ignorance, folly, or presumption of a writer who contradicts or ignores what is firmly established in science. On the contrary, having studied the subject well, I fully accept what is called the undulatory theory, with the admiration due to it, not as a theory, but as known truth, and without the reservation which Mr. Thomas at present makes in respect of "separate vibrations;" but which, if I do not mistake his meaning, he will, on further reflection, find it necessary to withdraw. The whole essence of the theory is involved in the fact that every separate wave maintains its own time invariable, and produces its own proper effect at every point in the ether which it reaches, whether such point is at rest, or is disturbed by any other wave or waves at the same time. Without this doctrine the theory would be inconsistent with the simplest principles of dynamics; it is, indeed, merely the same truth which is so much used in acoustics, and so beautifully illustrated in Professor Tyndall's lectures on sound. The prism necessarily alters the form of the wave-surfaces, and therefore bends the rays in different degrees, because waves of different lengths traverse the glass with different velocities from those with which they traverse the air; but it in no way modifies the wave-periods, on which alone the colour depends.

Newton's great discovery in optics was that the sun sent out an infinite number of different kinds of light, all differently refrangible, and producing different sensations of colour; and that the property, whatever it might be, which gives to each kind its peculiar refrangibility, is invariable, together with the colour-sensation that attends it. This is the very foundation of the science of colour. Sir David Brewster attempted to contravene it, and by some inconclusive experiments to show that colour was independent of refrangibility; but the examination of the question has made the truth of Newton's doctrine more evident than it was before (see Professor Stokes's lecture to the Chemical Society, 2nd June, 1864); and though Brewster's hasty theory of three kinds of light may still be met with in popular works, no adept in the science of light will now, I think, be found to maintain it.

As few even of those who have paid some attention to these subjects have read Sir Isaac Newton's propositions in colour in his own language, the following quotations from his "Optics" will be interesting, as exhibiting some of those striking propositions which he established by unanswerable arguments drawn from an admirable series of experiments. They undoubtedly form the groundwork of the science of colour, properly so called, to which a knowledge of the actual nature of light is not at all essential.

Definitions.—"The light whose rays are all alike refrangible, I call simple, homogeneal, and similar; and that whose rays are some more refrangible than others, I call compound, heterogeneal, and dissimilar. The former light I call homogeneal, not because I would affirm it to be so in all respects, but because the rays which agree in refrangibility, agree at least in all those their other properties, which I consider in the following discourse.

The colours of homogeneal lights I call primary, homogeneal, and simple, and those of heterogeneal lights, heterogeneal, and compound. For these are always compounded of the colours of homogeneal lights, as will appear in the following discourse."

Propositions.—"Lights which differ in colour, differ also in refrangibility.

"The light of the sun consists of rays differently refrangible.

"The phenomena of colours in refracted or reflected light are not caused by new modifications of the light variously impressed, according to the various terminations of the light and shadow."

[This refutes some of the then prevalent notions about colours, which Göethe and others afterwards attempted to revive.]

"All homogeneal light has its proper colour answering to its degree of refrangibility; and that colour cannot be changed by reflections and refractions."

Definition.—"The homogeneal light and rays which appear red, or rather make objects appear so, I call rubrific or red-making; those which make objects appear yellow, green, blue, and violet, I call yellow-making, green-making, blue-making, violet-making; and so of the rest. And if at any time I speak of light and rays as coloured, or endued with colours, I would be understood to speak not philosophically and properly, but grossly, and according to such conceptions as vulgar people in seeing all these experiments would be apt to frame. For the rays, to speak properly, are not coloured. In them there is nothing else than a certain power and disposition to stir up a sensation of this or that colour. For as sound in a bell or musical string, or other sounding body, is nothing but a trembling motion, and in the air nothing but that motion propagated from the object, and in the sensorium is a sense of that motion under the form of sound; so colours in the object are nothing but a disposition to reflect this or that sort of rays more copiously than the rest; in the rays they are nothing but their dispositions to propagate this or that motion into the sensorium, and in the sensorium they are sensations of those motions under the form of colours."

Propositions.—"Colours may be produced by composition which shall be like to the colours of homogeneal light as to the appearance of colour, but not as to the immutability of colour, and constitution of light. And those colours, by how much they are more compounded, by so much are they less full and intense; and by too much composition they may be diluted and weakened till they cease, and the mixture becomes white or gray. There may be also colours produced by composition which are not fully like any of the colours of homogeneal light." [The last sentence refers to the purples formed by mixtures of the red and violet rays.]

"Whiteness and all gray colours between white and black may be compounded of colours; and the whiteness of the sun's light is compounded of all the primary colours mixed in a due proportion."

"All the colours of the universe which are made by light, and depend not upon the power of imagination, are either the colours of homogeneal lights, or compounded of these, and that either accurately or very nearly according to the rule of the foregoing problem."

The rule referred to in the last of these extracts is a very remarkable one; and had it been attended to by subsequent writers on the theory of colours as it deserved to be, the common erroneous ideas about complementary colours would never have obtained the credit they have been honoured with, both in England and abroad. Newton arranged the series of the prismatic colours in the circumference of a circle, and prescribed the parts of the circumference which are to be occupied by the colours of the seven parts into which he divided the spectrum. The colours which fall opposite to each other are those which he was led by his experiments to regard as most nearly complementary in hue. From his diagram it appears that the middle of his red space falls opposite to that part of his blue space which verges on the green; and as his blue space includes all the seagreen-blue rays, up to the seagreen itself, this is perfectly correct according to all those experiments with the prism and with pigments, which I have endeavoured in my treatise and former letters to point out. The middle of his orange space falls opposite to that part of his indigo space which verges on his blue space; the first or golden part of his yellow opposite to the middle of his indigo space, which contains the deepest and purest blue; the greenish part of his yellow opposite to the middle of his violet; and the middle of his green space opposite to that point in the circle where the extreme rays of violet terminate in darkness, and those of red begin. Had Newton left a blank space in this part of the circumference, opposite to the green rays, the whole would almost perfectly agree with the results recently obtained by accurate observations with refined apparatus by Helmholtz and by Maxwell. But how different from the conventional system, which, contrary to all rational experiments, puts the red opposite to the green, the orange opposite to the pure blue, the yellow opposite to purple, and has ever since been followed by artists literally blindfold, as one would think, since the eye itself, if allowed to judge for itself, uniformly declares for the other system! This any one may see who will take the trouble to compare the effect of placing side by side the colours asserted to be complementary in the two systems; or will look at a shaded white surface through a small hole cut out in a sheet of paper coloured strongly with scarlet vermilion, with king's yellow, with emerald green, with verdigris, with cobalt, or with rose madder. The white surrounded by scarlet will not appear green, but seagreen; that surrounded by yellow

will not appear purple, but blue; that surrounded by green, not red, but pink; and the reverse: and as according to the terms of the well-known law of simultaneous contrast, the white always assumes a hue complementary to that of the surrounding surface, this is another proof for those who seek one, that our conventional complementary colours are not the true ones.

Newton seems to have regarded all the prismatic colours as equal in depth of hue, or equally distant from a neutral colour of the same brightness. If they were so, it might not have been easy to answer the inquiry why some should be called simple or primary in preference to others. But they are not so; Mr. Maxwell has proved that they do not lie in a circle about a centre of white, but in the form of a triangle, imperfect on one side, whose angles are occupied by the deepest red, green, and blue: so that all the colours which lie in the spectrum between the first and second, and the second and third of these may be produced by mixtures of these with the same depth of hue (or strength in proportion to their luminosity) which they possess in the spectrum itself.

I am sorry that so ingenious a thinker as Mr. Thomas shows himself to be should seem to adopt the common but inaccurate idea that a colour "may be raised in the eye as a compensation to some direct excitement of the retina from without." The real cause of the complementary ocular spectrum so commonly observed when the eye excited strongly with any colour is suddenly directed to a dull neutral ground, and of all the effects above alluded to under the term "simultaneous contrast," is evidently nothing but a reduced sensibility of the retina for that one or more of the simple sensations of colour with which it has just been so strongly affected. Thus a spot of white, when surrounded by blue, appears tinged with yellow, because the eye then becomes less sensible than it ought to be to the blue rays reflected by the white.

W. BENSON.

SIR,—Having had the advantage of a personal interview with Mr. Benson, and having put the question to him, "Why is green a primary colour?" I find that we are not agreed as to what constitutes a *primary* colour. His definition of primary colours is "the colours of the pure prismatic rays, being the *deepest* that can be found of their respective kinds;" while I have assumed, according to the generally received theory, that red, yellow, and blue are primary colours, because they *cannot be divided* into two other colours of the prismatic spectrum, and are therefore not compound, as orange, violet, green, &c.

Having, then, received an answer to my question, I have simply to say that I cannot see the force of Mr. Benson's definition, and that I certainly remain unconverted to his theory. But as I have no wish "to wrap the veil of any *false* theory about my eyes," I may perhaps let you know the result when I have further investigated his.

JAMES K. COLLING.

WAS JOSEPH A CARPENTER?

IN reply to Mr. Black's denial (see p. 647, *ante*) Mr. R. Gardner Smith writes,—"Mr. Black assures us that Joseph was *not a carpenter*, as has been supposed, but a *mason*, and for this opinion he gives two reasons.

I. 'The original term used signifies architect, builder, or mason, and *not carpenter*.' The question then becomes one of philology, and I think it requires no profound knowledge of Greek to enable any one successfully to dispute the point. It cannot be denied that the word in question, τέκτων, does mean sometimes architect or builder; it is, as every Greek scholar knows, derived from a word signifying 'to bring into being,' so it sometimes in classic Greek may mean an author or planner, and, with qualifying adjuncts, a worker in metal or in stone. Both Homer and Euripides use the word in the former of these senses. Still, I maintain that in those passages in the works of Greek authors where the word is used, its meaning in by far the majority of cases will be '*a worker in wood*,' *a carpenter*. Further, I dare affirm that if any English-Greek lexicon be consulted, the word *mason* will not be translated by τέκτων; and, on the other hand, I believe no Greek lexicon can be found which does not give as the principal meaning of the word, *a worker in wood*. Again, I may say that the early Greek fathers, in their works, had this idea. Justin Martyr says:—'Christ, being among men, was a maker of rakes and yokes, which were the works of carpenters.'

II. The other reason assigned by Mr. Black was this—'In the climes where Joseph dwelt, no wood was used in the erection of the structure of their houses, but stone only.' In other words, Mr. Black's logic seems to amount to this:—(1). Where the houses are built only of stone there can be no carpenters. (2). In Palestine the houses were built only of stone. (3). *Ergo*—In Palestine there could be no carpenters. (4). Conclusion No. 2. Therefore Joseph could not be a carpenter. Any schoolboy, I think, could detect the fallacy so palpable here. As to the first term: admitting that the houses were all of stone was there even then no need for workers in wood? Then as to these houses, was there really no woodwork about them? No beams in the roof, no doors separating the rooms, no lounging sofas whose framework was mostly wood, no elaborately ornamented ceilings of wood, no window-shutters which often were beautifully inlaid with many pieces of polished wood? Historians then must have been dreaming, and Eastern travellers continuously deceived.

I have not time to say more, but I think, sir, that many of your readers will still believe that the translators of our Bible, the old writers, and the old painters, too, were after all right, and that Mr. Black is wrong."

SMOKING-CARRIAGES ON RAILWAYS.

SIR,—I shall feel obliged if you will use your efforts to remedy an evil strongly felt by smokers. When gentlemen travel by rail they must do one of three things, viz., travel in a smoking-carriage and endure an amount of suffocating smoke alike injurious and unpleasant, or deprive themselves of the pleasure of a cigar and go in an ordinary carriage; unless they smoke in the ordinary carriage, which is, of course, exceedingly wrong, inasmuch as it makes it very uncomfortable for those who enter the carriage afterwards. This evil would, I think, be greatly averted by introducing a simple fan into the ceiling of the smoking-carriage, which would revolve directly the train was set in motion, bring pure air in and drive out the smoke;—a string or other simple means should be attached which would stop it at the will of the passengers. The force of air met by the fan would cause it to revolve and ventilate the compartment in the manner I have described.

WALTER CHESTERTON.

UNPAINTED DEAL, AND DISTEMPER COLOURING.

IN respect to the durability of unpainted deal, I noticed in a street of Vienna numerous instances of doors, &c., being of deal unpainted and unvarnished, and which appeared to stand perfectly well.

In this country it will no doubt last well indoors, but I think would not bear exposure to our moist climate. Apropos of atmospheric influences, I was struck in Vienna and also in Florence with the durability of the distemper colouring applied to the outside of houses, and giving to them as good an appearance as stone. I was told in the latter city it lasted twenty years. We know too well what an unsightly miserable appearance a house with us will present only three months after being coloured! This, I think, must be owing to the dampness of our climate. A durable water-colour is with us a desideratum.

P. E. MASEY.

SIR,—Noticing a letter in the *Builder* about the enduring quality of deal timber (unpainted), it brought to mind a circumstance noted when visiting Hertfordshire three years ago. I went to see the "great bed of Ware," and noticed a plain plank of deal, fastened at the foot of the bed, with a date roughly cut 1696. I was surprised at its perfectly sound condition after the lapse of so long a period, contrasting with the rotten state of harder wood of much later date: possibly this might not be the actual date of the addition to the bed.

A LOVER OF "THE BUILDER."

SIR,—In answer to your correspondent of last week signed "Plain Dealer," respecting deal timber in external work, my opinion is that it would lose all its colour in a very short time, and decay for want of nourishment, such as oil, paint, or varnish. I have seen the two ancient doorways from Norway that were at the South Kensington museum, and must say that they were remarkably sound. I noticed them particularly, as I executed the colouring of the two plaster casts, mentioned in the leading article of your last week's *Builder*. The pine wood these doorways were made of seems to be of a very hard kind, but I am inclined to think they must have had some coating of oil or varnish. To preserve deal from decay in a climate like England, I should recommend one or two coats of boiled linseed oil with best yellow bees-wax, say a quarter to one gallon: this would be found to be durable, and keep the deal from losing its colour, and much cheaper than using ordinary oil varnish.

THOMAS KERSHAW.

DEEP WELL SINKING.

THIS time of the year is the most suitable for well-sinking, and it can be done at half the expense when the springs are low. As to hydraulic machinery, atmospheric pressure should be thoroughly understood. In theory it is supposed to be 15 lb. to the square inch. In pumping machinery the pressure should not be more than 10 lb. to the square inch; that is to say, the seat-valve should not exceed 20 ft. in elevation, although the raising main pipe may be unlimited in height or distance. We find the air-pump will not raise mercury 28 in., and at times, when the barometer goes down, we have ½ lb. less.

Then, you may say, friction and leakage would reduce the drawing power to 10 lb. Serious mistakes are made in the erection of such machinery of great magnitude. It will have the same effect in water mains, syphons, &c. Persons qualified should adopt methods simple in construction, and easy capping in case of repairs. The turbine is much used.

T. PARR.

SHIPBUILDING IN WATER.

AN ENGINEER writes:—

With reference to the remark in your article on the "Launch of the *Bermuda*," what "Rennie, the architect and builder of London Bridge, of Southwark Bridge, and of Waterloo Bridge, would have done under the circumstances of having to place in the water such a structure as the *Great Eastern* or *Bermuda* dock," it is as well it should be known what the Rennies of the present age, the grandsons of John Rennie, have actually done in transporting a huge iron structure into the water. An iron floating dock, for the Spanish port of Carthagena, the first of its kind, was designed and constructed by them; and, instead of launching, it was built in a shallow basin, and when completed, the water was gradually allowed to flow in until the structure was afloat, as proposed in your article. The comparative size of the dock at Carthagena with the *Bermuda* may be made by the fact that the Carthagena dock has actually lifted a larger vessel, viz., the *Numancia*, than the class of vessel, viz., the *Bellerophon*, for which the Bermuda dock is intended. The following are the sizes of the *Numancia* and *Bellerophon*:—

	Numancia.	*Bellerophon.*
Length	316 feet.	300 feet.
Breadth	57 ,,	56 ,,
Displacement at low draught	7,420 tons.	6,372 tons.

CHURCH-BUILDING NEWS.

Norton (*Radnorshire*).—The parish church has been re-opened for divine service after restoration by Mr. Coleman, of Claxhill, builder, under the supervision of Mr. G. G. Scott, architect. The whole of the interior has been coated with plaster. A small transept, suitable to the size of the building itself, has been let in by means of low turned pointed arches. The exterior has been freshly pointed and dressed down, and a new low shingle spire has taken the place of the old one. A new Early Decorated window, consisting of three lights, has been inserted in the east end, filled with stained glass, the subject being Our Lord's Ascension. New windows of a similar character have also been placed in the transepts, the subject of that in the south side representing the "Call of St. Andrew," to whom the church is dedicated. In the north transept window the subject is Christ blessing little children. The portion of the church parted off from the nave for the tower has now been opened out to form a baptistery. A west window of stained glass has also been inserted, the subjects being the baptism of Christ by John the Baptist, and the charge to the Apostles, "Go ye forth to all the world, and preach the gospel." There are besides two new windows of grisailled glass placed in the chancels, and two others of the same kind in the nave. These latter all occupy the old window spaces, which are mostly splayed on the inside, and show an immense thickness of wall. The stained glass is from Messrs. Clayton & Bell's. The larger oak timbers of the roof have been preserved, but new intervening rafters of varnished deal have had to be used, the spaces between them being plastered. A new panelled chancel roof of varnished deal has also been added at a somewhat lower level than that of the nave. The old carved rood-screen has been repaired whilst the pulpit and lectern—both of carved oak—are new. The seats are all open, are of pine, and have oak ends. The flooring-tiles are all of a plain red colour in the nave, with a little variation in the sacrarium, but no speciality; they are from Godwin's works. A new organ, with complete pedal, six stops, and manual, has been placed in the north side of the chancel, at the sole expense of Mr. Cecil Parsons. It was made by Messrs. Forster & Andrews, of Hull. The contract for the restoration was 2,000*l.*, but extras have been incurred amounting to 200*l.* more.

Ollerton.—Boughton Church and the addition to the graveyard at Boughton have been consecrated. The old building was very dilapidated,

and inadequate to seat the population of the parish. The new church stands apart from the old site. The parsonage-house is nearly completed. Schools were erected a few years ago by Mr. J. W. Pickin, Whitmore. The style of the church is Geometrical Pointed, and it will seat 200. Mr. Fowler, of Louth, was the architect.

Newcastle-upon-Tyne.—The restoration of St. Nicholas's steeple has not yet been effected; nor indeed have the means been collected, the subscriptions remaining at 2,862*l.* 10*s.* 6*d.* against a contemplated expenditure of about 7,000*l.* The committee have resolved unanimously, "That in order to raise the necessary funds for the completion of the restoration of the steeple, it is recommended that a voluntary rate of 3*d.* in the pound be levied, and that the Corporation at their next meeting be respectfully solicited to permit their officials to take the requisite steps for collecting the same." The mayor stated that, Dissenter though he was, yet so thoroughly did he appreciate the beautiful steeple of St. Nicholas, and sympathise with the movement for its restoration, that he had determined to make his subscription up to 50*l.* He therefore handed to the honorary secretary 30*l.* (having previously paid his first subscription of 20*l.*). The committee were informed that Messrs. R. Stephenson & Co. had obligingly consented to allow a collection-box to be placed in their manufactory, so as to afford their *employés* an opportunity of contributing towards the restoration fund.

Ruyton.—The re-opening of the church at Ruyton-of-the-Eleven-Towns after its restoration has taken place. The present vicar (the Rev. J. Paget Wilkinson) restored, reroofed, and refitted the chancel, and has now effected the same improvements to the rest of the church—lowering the floor to one of the old pavements (one still older having been found some inches below), repaving, reseating with oak, warming with hot water, and generally improving the structure. It must also be mentioned that the peal of six bells which have been fixed in the tower were procured through the efforts of the vicar. Further efforts are required to recast the present very ugly porch, and to clear away the earth from the walls of the building. The whole of the work has been carried out under the superintendence of Mr. Pountney Smith, architect, Shrewsbury. A new window, which has been inserted in the south wall in the bapistery bay of the church, was supplied by Messrs. Done & Davies, of Shrewsbury. The subject on the left-hand opening represents "The Baptism." In the right-hand opening is a design taken from the left, "Suffer little children to come unto me." Above each of the subjects is a canopy, and a narrow border runs round each of the openings. In the quatrefoil above the heads are introduced the lily and the passion-flower. The same firm has also filled the large west window with grisailled glass, with stained border all round. In the tracery of the window are the figures of our Saviour, and the patron saint of the church, St. John the Baptist, on either side of them being the figure of an angel, in standing attitude.

Walgrave.—The parish church has been re-opened, after extensive alterations. The church was in a most dilapidated condition. The broach spire, being in a dangerous condition, has been partly taken down and rebuilt in the same form by previously marking the stones. In the south aisle the symmetry of the building is broken by an excrescence, in which there was formerly a vault belonging to the Langham family, and a gallery above it. These having both been removed, space is gained for a vestry (to be formed at some future time) and for a heating chamber below, which is entered from without the church, and contains a Haydon's heating apparatus. The west window and belfry arch which were both blocked up, have been re-opened. The walls have been stripped of plaster and pointed. New high-pitched roofs have been put on the nave and the chancel; the aisle roofs remain in the same form as before. Open seats of unstained oak have been substituted for the old pews. The arcade is Early Decorated. In the chancel the high roof affords a view of the east window, the upper portion of which was formerly hidden by a flat roof. A low side window was discovered in the usual place on the south of the chancel, but the tracery had been cut away on the outside before it was built up. The remains of what was believed to be a lead casement were observed in one of the openings of the window. The tracery has been preserved on the inside, and reproduced on the outside in one large block of Ketton stone. The chancel has been paved with Godwin's tiles. Oak stalls are fixed in this part of the church.

Leyburn (Yorkshire).—The diocese of Ripon has had another new church added to its number, Leyburn Church, in the North Riding, having been consecrated and opened for divine worship by the Bishop of Ripon. The site is the joint gift of Lord Bolton and the Hon. W. T. Orde Powlett, the next heir to the title and estates of Bolton. Lord Bolton also contributed 1,250*l.* towards the building fund. The entire cost was 2,900*l.* In addition to this, the necessary furniture of the church is the gift of the richer members of the congregation. The church is dedicated in the name of St. Matthew, and has been built from the designs of Mr. C. G. Wray, London, architect, in the Decorated style. It consists of a nave 57 ft. long and 23 ft. wide, with a north aisle of the same length and 13 ft. in width, separated from the nave by an arcade of four moulded freestone arches and piers. The chancel is 24 ft. in length and 18 ft. in width. The tower is at the west end, rising to a height of 65 ft., and consists of three stages, and a prominent feature in its appearance is a projecting stair turret at the south-east angle. The lower stage opens into the nave by means of a high moulded arch, and has a three-light window. There is an ornamental opening for a clock in the second stage, and in the upper stage are deeply recessed two-light belfry windows, fitted with louvres. The porch is situated at the extremity of the south wall and nave, and an organ-chamber and vestry are built on the north side of the chancel. The east window of the chancel has five compartments. The sittings in the church are open, and plain; they are of deal, stained and varnished, to correspond with the roofs, and afford accommodation for 350 persons. The brass-work is by Messrs. Hart & Sons, of London. Mr. Jones, of Leyburn, has been the contractor.

SCHOOL-BUILDING NEWS.

Beaminster.—New parochial schools have been opened here. The site is in White Hart-street. The buildings, which consist of an infants' and a girls' school-room, with class-room and residence for the mistress, stand upon ground extending 100 ft. from front to rear, and having a frontage of about 40 ft. The whole structure is built of local stone, in "random work," with a roof of red tiles, and dressings of Hamhill stone. The front of the building is thrown back about 14 ft. from the road, and is enclosed by a wall about 4 ft. high, with triangular coping of Hamhill stone. At the entrance to each school is a porch lighted by two lancet windows, with a second door leading into the school-room. The interior walls of the infants' room are whitened, and the roof is supported by light principals of varnished deal, the ends of which rest on plain corbels of Hamhill stone. At the end of the room facing the street are two large windows with trefoil heads, surmounted by a fanlight, whilst light is obtained by three large plain windows inserted in the side wall. The room is 40 ft. long by 20 ft. wide. The girls' school is of larger dimensions, being 45½ ft. in length, and at the head of it is a class-room 15 ft. by 22 ft. The style is the same as in the infants' room as regards the building; but all the windows in this apartment are plain, with merely a circular fan-light in the gable end. It is approached by a porch, and is separated from the class-room by folding or sliding doors. Surrounding the schoolrooms are necessary conveniences for the children, fuel-houses, out-buildings, &c. The yards, which are somewhat circumscribed, are gravelled. There is also a residence for the mistress. The structure was erected in accordance with designs by Messrs. Slater & Carpenter, of London, architects, Messrs. John Chick & David Hann, of Beaminster, contracting for the carpentering work, and Messrs. Chambers, of Beaminster, for the masonry. It is expected that the work, when completed, will have cost about 2,000*l.*, including the site.

Hurley (Berks).—The foundation-stone of a school has been laid at Birchet's Green, Hurley. This is a hamlet remote from the parish church and school.

Sharston.—The foundation-stone of the new national schools at Sharston, in the parish of Northenden, has been laid. The new schools are being built upon the site of the old one, at the meeting of the three roads from Altrincham, Cheadle, and Northenden. The accommodation is for 154 children, boys and girls—the infants' school being near to the church, in the village of Northenden, and more than a mile distant. There are two school rooms, one 39 ft. by 20 ft., and the other 30 ft. by 20 ft., with a class-room common to both. There are separate entrances, play-grounds, porches, lavatories, and conveniences, for the girls and boys respectively. There is a third porch to the schools, for visitors, with doors communicating with both girls' and boys' rooms. At the eastern extremity of the group is the master's house, with the usual complement of six rooms, and a cellar and pantry besides. The walls are being built of brick, of two colours, with moulded bricks in arches, strings, cornices, &c. The windows are all of white stone, contrasting with the framework of red brick which surrounds them. There will be one rose window, and several others with traceried heads of various patterns. The style is Tudor, harmonizing with the parish church. The contract has been taken for 1,213*l.* by Mr. Joseph Dawes, of Cheadle. The architects are Messrs. J. Medland Taylor & Henry Taylor, of Manchester.

Ashton.—The foundation-stone of a new school, at Waterloo, in the parish of Christchurch, Ashton-under-Lyne, has been laid. The building will contain a room 60 ft. by 30 ft., and two class-rooms; and, with an apse at the east end, can be used either as a school or, when required, for divine service. It is calculated to hold 260 day scholars. Mr. John Eaton, of Ashton, is the architect.

Books Received.

A Treatise on the Steam-engine in its various Applications. By JOHN BOURNE; being the eighth edition of "A Treatise on the Steam-engine," by the Artisan Club. London: Longmans, Green, & Co. 1868.

Examples of Modern Steam, Air, and Gas Engines of the most recent approved Types, accompanied by Working Drawings. By JOHN BOURNE. Part IV. London: Longmans, Green, & Co.

WE take it ill of ourselves that we have not before now mentioned the appearance of a new edition of Mr. Bourne's well-known and widely-appreciated "Treatise on the Steam-Engine." It is dedicated to Mr. C. Hutton Gregory, and contains some emendations and improvements; but finding that there was a large amount of important information which could not be added without too largely increasing its size, the author determined on publishing the second work named at the head of this notice, and concerning which we have already informed our readers. Mr. Bourne has long seen that in the case of steam-engines a given quantity of heat does not generate more than *one-tenth* of its equivalent power, the rest being lost from the imperfections of the machine, and believes it impossible that this enormous fault, now it is known, can be much longer tolerated. If we had a good way of transforming heat into electricity, we should be able to work an engine with little more than one-tenth of the fuel now required! In his new work he brings forward the expedients which have been proposed to take the place of the steam-engine, and criticises their merits and promise. We should not be surprised if important results followed its publication. We can conscientiously recommend strongly for increased circulation both Mr. Bourne's works.

Miscellanea.

PLANS OF LABOURERS' COTTAGES.—Numerous plans by competitors for the prize of 20*l.* offered by the Hertford Labourers' Friend Society for the best plan of a pair of labourers' cottages to be erected for 200*l.*, have been sent in. In most of the plans, says the *Hertford Mercury*, the apartments are sufficiently wide and long, and some of the living-rooms are very good indeed; but the height is not what it should be. In awarding the prize, we suppose that the judges will feel tied by the conditions to those plans which are guaranteed to be carried out at a cost of 200*l.*; but the guarantee is in many cases made conditional on neighbourhood, railway communication, &c. The prize was to be awarded at the dinner, after the Agricultural Show.

ROME.—A letter from Rome says:—"The discoveries of the Emporium continue, greatly to the satisfaction of antiquarian connoisseurs and to the increased reputation of Commander Visconti, whom the Pope has just nominated a baron, as doubtless you have heard. The excavators have found 432 blocks of marble of colossal dimensions; 1,256 others suitable for statues, for the pavement of churches and of public buildings; and upwards of 2,000 of smaller size."

THE SEA-WALL PROMENADE AT BRIDLINGTON.—After an expenditure of much time and money in planning, forming, and perfecting the sea-wall promenade at Bridlington Quay, it is pleasant to see this place of resort so popular as it is. It does not appear that there is any special need of further improvement to be made in the quay at present other than getting the several plots of building-ground built on, as soon as possible, with mansions similar to those recently erected in the new street.

BARROW-IN-FURNESS.—The corporation of Barrow-in-Furness has just acquired a public square, comprising a town-hall, a market-hall, police courts, and business offices, built in the centre of the town two years ago, and vested in the hands of the Duke of Devonshire and Mr. Ramsden, the managing director of the Furness railways, as trustees. The purchase-money, 15,000*l.*, is to be paid immediately. The greater portion of the property has for some time been in the occupancy of the corporation.

VIENNA PALACE OF THE FINE ARTS.—On the 1st inst. the first stone of the Palais des Beaux Arts, in Vienna, was laid by the Emperor. The day chosen was that of the opening of the general exhibition of German art, which had attracted an immense number of artists to Vienna. The authorities of the city gave a banquet in honour of this the tenth meeting of the artists of Germany, the number of guests amounting to 550, the burgomaster of Vienna filling the presidential chair, and being supported by the ministers.

ACCIDENT TO TEDDINGTON LOCK.—A high tide, assisted by the low state of the water above, recently lifted out the paddles which are used in constructing the "wear," and carried them up stream. Sufficient time had not elapsed to enable some men to replace them properly. The tide, which continued to run up for some time, no doubt reached Hampton Court. The wreck of the "wear" went as far up as Kingston, or rather the island below Kingston railway bridge. The water, it seems, by this occurrence, above the lock, was reduced between 4 ft. and 5 ft.

BEAULIEU ABBEY HOUSE, HANTS.—This Abbey House is now undergoing thorough renovation, previous to its being the permanent residence of Lord Henry Scott, a son of the Duke of Buccleuch. The Abbey House was originally the abbot's residence and private chapel. Margaret of Anjou's apartments in the Abbey House, with their ancient furniture, are now closed to the public, and only the doorway where she made her escape from the abbey grounds, and the spot in Beaulieu river where she embarked after the period of her claiming sanctuary had expired, can be visited by tourists.

ARBITRATION CASE, LEEDS.—An important arbitration case has just been concluded at Leeds, before Mr. Hunt, from the Board of Trade, occupying eight or nine days in hearing it. The two companies (the London and North-Western Company and the North-Eastern Company), in forming their new station at Leeds, take down the Midland Company's engine-house, and buy about eleven thousand yards of land from the latter company, and also use the Midland Company's road in front of the Queen's Hotel as the access to the new station, and the Midland Company arch over about half of the land which the two companies had acquired the right over from the Leeds and Liverpool Canal Company, at a cost of about 10,500*l.* For that land the two companies asked 11,000*l.* from the Midland Company. But the free use of the surface of the arches is somewhat interfered with by lights in the tops of them; and Mr. Hunt has awarded the Midland Company to pay 8,500*l.* for it to the two companies. The Midland concluded their case by crediting the value of the land they so arch over, and still asking for a balance of about 109,000*l.* from the two companies, whilst Mr. Hunt has awarded them 42,000*l.* only, and leaves each party to pay their own costs.

AIR NAVIGATION.—M. Joseph Livtchak, a Russian journalist, in a letter to the *Lemberg Slavo*, maintains that he has solved the problem of navigating the air. The motive force applied by him is steam; the rate of speed attainable with his machinery he estimates at eighty miles an hour. Years ago we insisted that if we were ever to navigate the air it must be by power, not by lightness, and that until a steam or electrical engine were taken up the air would be master. A congreve rocket to take us up, and an umbrella to let us down, formed our initial machine.

PICTURES AT CRAWLEY.—Through the exertions of Mr. Mark Lemon and some few of the other inhabitants of Crawley, in Sussex, a collection of paintings by living artists has been got together, and will be open to the public on the 1st of October. It is advertised that it will be kept open "in the first instance" for ten days, probably to ascertain how it is appreciated; but the time will doubtless be extended if found desirable. Every landlord and employer in the neighbourhood should see that their tenants and workpeople and their children have an opportunity to visit the collection.

EXCURSION OF THE NORFOLK AND SUFFOLK ARCHÆOLOGICAL SOCIETIES.—It is usual for the former of these societies to make at least one general excursion during the year, but it has this season been put off later than usual. Arrangements, however, were at last made for an excursion, in conjunction with the Suffolk Institute of Archæology, to the various churches at Haddiscoe, Haddiscoe Thorpe, Toft Monks, Fritton, Herringfleet, Blundeston, Flixton Ruin, and Oulton. All the members had been advised by circular to meet at Haddiscoe station, and accordingly about fifty ladies and gentlemen were assembled there at the appointed time. Omnibuses and carriages had been prepared for their conveyance. In the course of the day this party was further increased at the different churches visited. The weather could not have been more suitable.

SCIENTIFIC INSTRUCTION IN YORKSHIRE.—A public meeting of schoolmasters on the subject of "Scientific Instruction," called by the Yorkshire Board of Education, has been held under the presidency of the Mayor of Leeds, in the Civil Court Room of the Leeds Town-hall. There was a numerous attendance. Mr. Sales, the secretary of the York Board of Education, stated that the Yorkshire schools were very deficient in the means of supplying scientific instructions, and the meeting had been convened for the purpose of affording information regarding the scheme which the Department of Science and Art had devised for the benefit of the industrial classes, and with the object of procuring them proper scientific instruction. Mr. Iselin then submitted a summary of the plan proposed by the Science Department for adoption. He also spoke highly of the success which had attended the scheme in Lancashire and Cheshire. Mr. J. G. Fitch, of York, and Mr. Traice, of Manchester, then addressed the meeting, and Mr. Jarmaine announced that he was about to establish a class, with the object of teaching chemistry to schoolmasters in Leeds. After some further conversation, the proceedings terminated with the customary compliment to the chairman.

"REARING" OF THE TOWN-HALL, ROCHDALE.—The "rearing" the Rochdale Town-hall has been celebrated in the large assembly-room over the Co-operative Store, Toad-lane. The edifice, of which we gave a view and plan in our volume for 1866, pp. 868-9, is not yet completely erected, but it is far advanced. The west end is covered in and slated; portions of the east end are rapidly approaching completion also; and several principals for the roof of the great hall have been placed. The dimensions of this room will be 92 ft. long by 57 ft. wide, and 75 ft. elevation from the floor to the roof; it will be lighted by fourteen traceried windows of great altitude, and by a circular window 16 ft. 8 in. in diameter at each end, near the roof. At the west end will be an orchestra of some 33 ft. by 12 ft., separated from the large hall by lofty columns, divided into two bays. A portion of the tower has had to be taken down, in order to substitute girders for an arch which it was found would not be so safe as the former. There is now apparently sufficient stone on the ground to complete the job. About 200 persons, including several workmen employed by Messrs. Warburton, of Harpurhey, the contractors, on other works in different towns, partook of the entertainment, which was accompanied by music during the evening.

CLOSE OF THE NORWICH EXHIBITION.—The exhibition of modern paintings at the artists' room will close on the 26th instant, and the attendance of the general public, it seems, fully justifies the proposal to establish a permanent picture gallery in Norwich.

RAISING A FLAME.—Among the *brevets d'invention* recently granted in France, we read of a strong coffer, the peculiarity of which seems to be that if fraudulently opened it will kindle a Bengal light, brilliant enough to assemble a multitude, who will firmly believe that the house is on fire.

ARTISANS' DWELLINGS ACT.—The Chelsea Vestry have the credit of being the first, we believe, to put in force the Artisans' and Labourers' Dwellings Acts. At the last meeting, with reference to a nuisance in Wickham-place, it was resolved that the new Act should be put in force.

THE NEW STREET THROUGH THE CITY.—In the course of a few days the block of houses extending along the Poultry, from the western side of the Mansion House, will be removed for the purposes of the new street which is to run from that point to Blackfriars Bridge. At the north side of Cannon-street the ground has already been cleared.

CLOSING OF THE LEEDS FINE ART EXHIBITION. The executive committee of this exhibition have decided that it shall close on Monday, October 26th, so that a month now remains during which the art treasures can be inspected. The total number of admissions since the opening day has been—by payment, 278,956; by season tickets, 87,981; total, 366,937.

KENSINGTON IMPROVEMENTS.—An improvement is now being effected in Kensington, involving the demolition of sundry blocks of buildings, to facilitate the passage of the traffic through the High-street of the "Old Court suburb." Yesterday, twenty-seven dwelling-houses and premises, situated in High-street, Young-street, Market-court, and Gardners'-buildings, forming a portion of the projected alteration, were disposed off by auction, and arrangements made for the immediate clearance of the ground to widen that great thoroughfare.

DESTRUCTION OF IRISH ANTIQUITIES.—A correspondent, writing to the *Cork Examiner*, gives this account of the way in which antiquities in the Green Isle are dealt with. The Earl of Dunraven, with Dr. Stokes, went to see the ruins of Nimard Castle, and the former, knowing the locality by means of previous visits, looked for the oratory of Kilmurry, which stood above the castle. A farmer, by way of accounting for the utter disappearance of the older structure, told the earl that the proprietor had thrown it down, in order to build his own house with its materials.

PETITION FOR A FISH MARKET IN THE LIMEHOUSE DISTRICT.—The Board of Works for the Limehouse district, learning that it is in contemplation to remove Billingsgate Market from its present site, in consequence of the inconvenience arising from its inadequate size and its crowded locality, have forwarded a petition, praying that in that event the Corporation will apply for an Act of Parliament to establish a fish-market at Shadwell. They suggest a site on the river-side at Shadwell, close to the entrance of the London Docks, as a most eligible spot, for various reasons.

COST OF ABBEY MILLS PUMPING STATION.—At the last meeting of the Greenwich District Board of Works, Mr. Maslem brought under notice the recent visit paid by the different metropolitan Boards to the Abbey-mills Pumping Station. He complained of the lavish expenditure for the building in question, which he said to a stranger might be taken for a mosque or Chinese temple, and the cost of which had not been less than 200,000*l.* For embellishments no music-hall in London could be compared with it, and the cost of the roof alone he held to be sufficient to erect a building suitable for the purposes for which the pumping station is required. Mr. Halsey, another member, spoke of the gold and crimson railings, the polished oak doors, filled in with bronze flowers, the cost of which could not have been less than 200*l.* each; and Mr. Hunt said the building was an elegant structure in a swamp, and had more the appearance of an exhibition than anything else. Ultimately a resolution was passed expressing the dissatisfaction felt at such use having been made of the ratepayers' money.

"IMPERIAL GREEN."—*Once a Week* announces the production of a green pigment which is above "suspicion." It is a preparation of a salt of chromium, is brilliant in tone,—the tone is not mentioned, however,—and is quite harmless. It is to be called "imperial green."

ARCHÆOLOGICAL CONGRESS IN BONN.—An international archæological congress has just been opened at Bonn, Prussia. The proceedings were commenced by a speech from M. Noiggerotte, after which the burgomaster of the town warmly welcomed the visitors. In the evening a banquet was given to 200 members assembled.

EXHIBITION OF WORKS OF ART AT WEST BROMWICH.—An exhibition of works of art, chiefly contributed by the tenantry of the Earl of Dartmouth, on his several estates in Yorkshire and Staffordshire, has been opened, under favourable auspices, in the large drill-room and theatre, Queen-street, West Bromwich. According to the programme, the exhibition consists of "useful and ornamental needlework, works of art, cloth from the Yorkshire looms, hand-made lace from Buckinghamshire, and various articles of industry." The ultimate purpose is to raise a fund for the purchase of a lifeboat for the National Lifeboat Institution.

HOSPITAL FOR SICK CHILDREN, MANCHESTER. The foundation-stone of a new dispensary for sick children in Gartside-street, Deansgate, Manchester, has been laid. The building is intended as an adjunct of the general hospital and dispensary for sick children which now occupies premises in Bridge-street. It is being erected by Messrs. R. Neill & Sons, from the designs and under the superintendence of Messrs. Mills & Murgatroyd, architects. It will cover a plot of ground of 530 square yards in area, with frontages to Gartside-street and Green's-court. The building will contain, on the ground-floor, a waiting and reception room, 60 ft. by 32 ft., entered from Green's-court in the rear, and capable of accommodating at one time about 350 persons. Adjoining this, and so arranged as to be in the line of route to the exit, which is in Gartside-street, are two surgeons' consulting-rooms, 27 ft. by 16 ft. and 17 ft. by 16 ft. respectively, followed by the dispensing-room. The building is to be warmed by open fireplaces. In order to give sufficient altitude to the front elevation, the ground-floor has been fixed at between 5 ft. and 6 ft. above the street level, and it is only in the Gartside-street front that the very simplest and plainest materials and design have been departed from. This front will be executed in stock bricks, with stone dressings, Mediæval in character, and will consist of a central gable with open porch. On each side a range of five arcuated windows will be surmounted by a frieze, with an inscription in coloured tiles. A moulded stone cornice and high-pitched roof will complete this elevation.

STEEL AND IRON BOILERS.—Messrs. Carroll & Snyder, proprietors of the Fort Pitt Boiler Works, Pittsburg, have lately built a boiler of Black Diamond steel. It is a cylinder boiler, without flues, and is made entirely, even to the bolts, of No. 3 homogeneous steel, made at the Black Diamond Steel Works. The plates are full ¼ in. thick, and the heads ¾ in. Its length is 5 ft. 8 in., and its diameter 3 ft. 2 in. A trial of the strength of the boiler has been made in the presence of the Government inspectors and a large number of boiler-makers and others. A small hydraulic pump, the same as is used in testing iron boilers, was employed. The intention was to put on pressure enough to burst the boiler if possible. As the gauge approached 600 lb., the gasket, or leaden joint by which the manhole is stopped, began to leak freely, and water also spurted in the form of spray from the seams, until it was found impossible to maintain the pressure. The circumference of the boiler was now found to have increased 1¼ in. by the stretching of the plates. The leaks mentioned having been partially stopped, three more trials were made, thus more severely testing the boiler by their repetition. By the last of these a pressure of 665 lb. was reached without producing any further effect than to cause the boiler to swell still more, until it increased 2½ in. in circumference. There were no signs of the plates giving way at the rivet-holes, where they are necessarily weaker than at any other part, the whole strain being thrown upon the part remaining between the holes. Heretofore no boiler has ever stood a greater pressure, it is said, than 538 lb., and that was one expressly prepared for the test.

PROPOSED MEMORIAL OF LEIGH HUNT.—The amount required, small as it is, has not yet been fully subscribed, and we therefore add to our former intimation that the treasurer of the fund is Mr. Townshend Mayer, of 25, Norfolk-street, Strand, who will gladly receive subscriptions.

FONTAINEBLEAU.—Extensive works have been commenced for the increase of the internal accommodation of the Château de Fontainebleau. The Court of the Fountains will be soon completed, by a pavilion parallel to the Galerie François I. This new part of the palace will be called the Pavilion Napoleon III., and contain the apartments of the Imperial family. It will look on the court on one side, and on the artificial lake on the other; and will be separated from the theatre, and from the pavilion of the Queen Mother, by arcades designed from those of the Pitti Palace at Florence.

TENDERS.

For Congregational Church, at New Cross. Mr. J. H. Blake, architect. Quantities supplied by Mr. J. A. Bunker :—

Rider & Son	£1,875 0 0
Brass	1,867 0 0
Macey	1,819 0 0
Brown & Robinson	1,790 10 0
Carter & Son	1,790 0 0
Turner & Son	1,755 0 0
Colls & Co.	1,747 0 0
Deacon	1,650 0 0

For Assembly-rooms at Havant, Hampshire, for Mr. C. Longcroft. Mr. R. W. Drew, architect. Quantities not supplied :—

Deacon	£1,720 0 0
Stallard	1,387 0 0
Tear	1,343 0 0
Carroll	1,127 0 0

For building 106, Fenchurch-street, and 62, Leadenhall-street, for Messrs. Innes, Brothers & Co. Mark-lane. Mr. R. B. Marsh, architect. Quantities by Mr. G. P. Baggett :—

Macey	£4,856 0 0
Henshaw	4,775 0 0
Carter	4,600 0 0
Newman & Mann	4,556 0 0
Foster	4,529 0 0
Coleman	4,500 0 0
Pritchard	4,427 0 0
Myers	4,389 0 0
Conder	4,380 0 0
Brass	4,093 0 0
Hill, Keddell, & Waldram*	4,077 0 0

* Accepted.

For warehouse for Messrs. Adams, Brothers, West Bute Dock, Cardiff. Mr. J. Hartland, architect. Quantities supplied :—

Shepton	£2,294 0 0
Lock	2,284 0 0
Seager (accepted)	2,230 0 0

For detached villa residence and offices, at Linkfield-lane, Redhill, for Mr. W. E. Dawson. Quantities supplied by Messrs. Rees & Son :—

Regis	£1,995 0 0
Holbrook	1,970 0 0
Wood	1,961 1 11
Abbott	1,960 0 0
Waterman	1,943 0 0
Wigmore	1,800 0 0
Blake	1,800 0 0
Brown	1,763 0 0
Nightingale	1,757 0 0
Anson	1,690 0 0
Deacon	1,650 0 0

For new Wesleyan Chapel at Purton, Wilts, near Swindon, exclusive of old chapel. Mr. T. S. Lansdown, architect. Quantities supplied by the architect :—

	With Bath stone dressings.		Native stone dressings.
Gray	£372 0 0	...	£367 9 0
Titmarsh	300 0 0	...	290 0 0
Drew	275 0 0	...	...
Barrett	240 8 0*	...	238 0 0

* Accepted.

For St. Ann's new Boys' Schools, Birkenhead :—

Fisher	£1,320 0 0
Cameron	1,311 7 0
Harkness & Dempsters	1,300 0 0
Dobson	1,259 8 9½
Black & Readie	1,233 0 0
Forde	1,170 0 0
Morris & Allen	1,167 10 0
Bleakley	1,165 0 0
Booth & Richards (accepted)	1,150 0 0

For additions to the Chelmsford Union-house. Mr. C. Pertwee, architect :—

Chont & Son	£557 0 0
Roper	552 0 0
Baker	550 0 0
Thorn	549 0 0
Last	470 0 0
Fincham (accepted)	455 0 0

For heating and lighting Bocking Chapel. Mr. C. Pertwee, architect :—

	Lighting.		Heating.
Harrison & Bettridge	£115 0 0	...	£46 10 0
Dennis & Scruby	85 0 0	...	45 0 0
Christy	90 12 6	...	...
Farrow	...	...	41 0 0
Crittall (accepted)	87 18 6	...	31 18 0
Bloomfield	...	...	46 0 0
Biggs	...	...	29 10 0

For house and offices, Woodford, Essex, for Mr. H. F. Barclay. Messrs. Hooper & Lewis, architects :—

	For House, &c.		Fencing and Gates.
Sharpington & Cole	£2,570	...	90
Killby	2,434	...	115
Egan	2,316	...	110
Morter	2,287	...	120
Hedges (accepted)	2,240	...	118

For new villa residence at Swindon. Mr. T. S. Lansdown, architect. Quantities supplied by the architect :—

Wooldridge	£808 15 0
Dover	750 0 0
Drew	745 0 0
Spreadbury	597 0 0
Selby	573 0 0

For villa residences on Caterham Manor Estate, for Mr. G. Parbury. Mr. R. Martin, architect. Quantities supplied by Mr. Bunker :—

	Villa, No. 2.	Stable.	Villa, No. 3.
Wheeler	£1,374	76	1,209
Axford	1,360	89	1,300
Deacon	1,344	70	1,250
Carter & Son	1,335	85	1,335
Gammon & Son	1,317	73	1,273
Stonor	1,274	66	1,200
Turner & Son	1,268	63	1,236
Colls & Co.	1,224	75	1,197
Regis	1,202	68	1,165
Baldwin	895	58	895

For house at Caterham, for Mr. J. B. Fletcher. Mr. R. Martin, architect. Quantities supplied by Mr. Bunker :—

	House.	Extra for Green Slates.	Extra for Pitch Pine.	Extra for Burham Brick.
Axford	£2,499	£82	£105	£91
Stonor	2,490	8	103	87
Wheeler	2,469	9	113	89
Gammon	2,453	10	123	91
Carter & Son	2,340	10	90	100
Colls & Co.	2,288	48	110	...
Turner & Son	2,278	24	52	43
Deacon	2,264	16	125	22
Regis	2,184	5	34	15

For the erection of a pair of villa residences, Fortis-green, Finchley, for the Rev. C. Room. Mr. W. Waymouth, architect :—

Fish	£2,590 0 0
Axford & Whillin	2,515 0 0
Henshaw	2,378 0 0
Colls & Son	2,376 0 0
Webb & Sons	2,380 0 0
Foster	2,330 0 0
Cook & Co.	2,272 0 0
Merritt & Ashby	2,139 0 0

For fifteen cottages and three shops, at Ilford, Essex, for Miss Harvey. Mr. W. Allen Dixon, architect. Quantities supplied :—

Eaton & Chapman	£2,985 0 0
Manley & Rogers	2,975 0 0
Staines & Son	2,948 0 0
Mann	2,879 0 0
Garrud	2,613 0 0
Withers	2,495 0 0

For two houses and alterations at Windsor-court, Monkwell-street. Mr. W. Smith, architect :—

King	£975 0 0
Merritt & Ashby	851 0 0
Sherman	825 0 0
Bowley, Brothers	800 0 0
Waters	796 0 0
Pearce	700 0 0
Blackmore & Morley	680 0 0
Crabb & Vaughan	596 0 0
Fletcher & Coughley	594 0 0

For the erection of a warehouse, in the city of Canterbury, for Mr. James Green. Mr. John Green Hall, architect :—

Epps	£3,890 0 0
Dickinson & Co.	3,810 0 0
Sollit	3,810 0 0
Wilson	3,500 0 0
Gaskin & Co.	3,490 0 0
Adcock	3,444 0 0
Naylar (accepted)	3,385 0 0
Lawson	3,289 0 0

For alterations to the George Hotel, Strand. Mr. M. P. Manning, architect. Quantities supplied by Mr. D. J. Brown :—

Henshaw	£2,379 0 0
Longmire & Burge	2,253 0 0
Foster	2,230 0 0
Macey	2,146 0 0
Newman & Mann	2,045 0 0
Mather & Read	2,002 15 0
Longmead & Way	1,990 0 0
Mann	1,977 0 0

For five houses and shops in St. George's-road, Southwark. Quantities supplied. Allowing for old materials. Mr. H. S. Legg, architect :—

Bonald	£4,805 0 0
Raynham, Brothers	4,247 0 0
Carter	4,100 0 0
Henshaw	4,083 0 0
Blackmore & Morley	3,994 0 0
Linfield	3,904 0 0
Wigmore	3,900 0 0
Ebbs	3,874 0 0
Nightingale	3,846 0 0
Perry	3,775 0 0
Falkner	3,679 0 0
Crabb & Vaughan	3,594 0 0
Wills	3,569 0 0
Merrit & Ashby	3,554 0 0
Scrivener & White	3,407 0 0
Palmer	3,320 0 0
Wicks, Bangs, & Co.	3,305 0 0
Gibbs	3,135 0 0
Pearce	2,761 0 0